

COMMUNITY PLANNING ASSOCIATION OF CANADA

COMMUNITY PLANNING REVIEW



HOUSING DESIGN SUPPLEMENT TWO

This publication was prepared by the Central Mortgage and Housing Corporation and has also been published in the Journal of the Royal Architectural Institute of Canada. It is the second part of a study, the first half of which was published in September 1952.

REVUE CANADIENNE D'URBANISME

L'ASSOCIATION CANADIENNE D'URBANISME

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We are concerned here with the design of living space for communities of households, rather than with the design of individual houses for particular families. Housing design is the translation of social requirements into the materials and forms of buildings, community services and open spaces. It is a social art that has to be practised within the framework of certain established methods and economic limitations.

In conceiving housing programmes and devising housing projects to meet social needs, the designer is aware of the great diversity in the character and purchasing power of the households in any community. A comprehensive approach to housing design would be based on an analysis of housing needs, studying the number of dwellings required to have one, two, three or four bedrooms, the number that should be in ownership or rental occupation, the desirable proportions of single-family houses and apartment units, the relative needs for low-rental, middle-priced and higher-priced accommodation. On the basis of such knowledge obtained in housing survey and Census it may be possible to design well-rounded neighbourhoods for all sorts and conditions in a community.

This proper aim to fulfil housing needs is, however, circumscribed by the realistic economics of the housing market, which operates on effective demand rather than on need. Housing, as real property, attracts investment and retains its value if it is in marketable form. Consequently housing production tends to be concentrated on the medium or "mean" types of accommodation that are most easily disposed of on the market. Houses that are unusually small or large, are novel in design or are in any other way removed from the middle of the road, do not easily fit into the orthodox system of mortgage financing.

The designer is not only faced with this economic resistance to his freedom in interpreting social needs, expressed in the regulations for conformity with the mortgage system; he is also circumscribed by the building codes and planning regulations which municipalities impose in the effort to raise standards of building and of living. Though, in detail, these standards sometimes appear to frustrate the imaginative efforts of the designer, they are of course in total effect a most important line of departure for improving the amount and quality of living space. However tempting it may be to solve immediate economic problems by making concessions to building standards, housing designers should be the most jealous guardians of this method of protecting future generations against a deterioration of the housing stock.

Out of recognition of the need for diversity in the housing programme the National Housing Act 1944 provides financing arrangements for many different kinds of housing, from home-ownership to low-rental housing. There are arrangements offered for the assembling of suburban land for housing projects and there is financial aid for the redevelopment of slum areas. In fact the National Housing Act makes possible the production of many varieties of housing which could not otherwise be brought into the housing market. It is thus an essential instrument for the design of neighbourhoods containing that diversity of housing accommodation which is required to match the diversity of housing needs.

In order to design a single house for a family or a housing project for a large number of households, some basic information is required concerning family size and way of life. On a larger scale, a housing programme for a whole community or nation must arise out of a knowledge of the circumstances.

Since the last war the Central Mortgage and Housing Corporation and the Dominion Bureau of Statistics have together maintained a current score of housing production and of the rate of family formation. The decennial Housing Census provides a definitive record on which this cumulative score can be based. The Census of 1951, which surveyed every fifth household, has now provided new facts which assist in appraising the whole housing situation in Canada. Some items of this information are tabulated on these pages. Since these are expressed in national and regional figures they are not, of course, applicable to actual projects of housing design. The figures suggest, however, that a comparable knowledge of local circumstances is an essential basis for the determination of local housing programmes and the design of housing projects.

Between 1941 and 1951 the population of Canada increased by 21 per cent, from 11.5 to 14 millions. During this time the number of families increased by 30 per cent, from 2.5 to 3.5 millions. The increase in the number of families is, of course, a more useful guide to housing requirements than the increase in population. However, in addition to families, there is a certain part of the population which does not live in family groups but does occupy separate dwellings in what are called "non-family households". In fact this number represents a considerable part of the population that has a claim upon the stock of housing. Between 1941 and 1951 these non-family households increased by 22 per cent, from 373,000 to 456,000. Taken together, the families and non-family households numbered 3,743,000 in 1951, an increase of 845,000 or 29 per cent from 1941.

For a large part of the time while this increase in population was taking place, Canada was occupied in wartime production and not able to devote itself to the production of housing. However, during the decade the number of dwelling units increased by 26 per cent, from 2,790,000 in 1941 to 3,536,000 in 1951. This was an increase somewhat less than the increase in the number of families and non-family households.

A considerable number of dwellings occupied and included in the Census stock-taking were obsolete, in need of major repair, in areas overshadowed by commercial and industrial buildings or in some other way evidently did not satisfy reasonable standards of

PEOPLE TO BE HOUSED

Number of Households in Canada (thousands)

	Families	Non-Family Households	Total Households	Population
1941.....	2,525.2	373.0	2,898.2	11,506.6
1951.....	3,287.3	456.2	3,743.5	14,009.4

Net Family Formation

	Increase in Thousands	Percent Increase
1946.....	102.0	3.6
1947.....	71.5	2.5
1948.....	78.7	2.7
1949.....	73.2	2.4
1950.....	68.7	2.2
1951.....	95.8	2.9
1952.....	93.8	2.8

Number of Persons per Household

	Number of Households	Percent
1 person households.....	252,436	7.4
2-3 " ".....	1,399,135	41.0
4-5 " ".....	1,085,385	31.8
6-9 " ".....	581,678	17.1
10 " ".....	90,650	2.7

Regional Characteristics 1951

- Families and non-family households (thousands).
- Average size of family.
- Percent of families of 3 or less.
- Excess of family and non-family households over fully-serviced occupied dwellings (thousands).

	A	B	C	D
Maritimes.....	396.9	4.0	49.1	51.2
Quebec.....	942.5	4.2	47.6	103.2
Ontario.....	1327.0	3.4	61.1	205.7
Prairies.....	716.4	3.6	54.4	81.6
British Columbia.....	360.7	3.3	62.4	39.4

THE STOCK OF HOUSING

Number of Dwellings in Canada (thousands)

1941	2,790.3
1951	3,535.9

Completions and Conversions

1946	67,194
1947	79,231
1948	81,243
1949	91,655
1950	91,754
1951	84,810
1952	76,302

Average Number of Rooms per Dwelling

	Number of Dwellings	Percent
1 room dwellings	61,795	1.8
2 " "	162,165	4.8
3 " "	340,895	10.0
4 " "	668,760	19.6
5 " "	674,330	19.8
6 " "	662,390	19.4
7 " "	837,270	24.6

Regional Characteristics 1951

- A. Percent of occupied dwellings fully-serviced.
- B. Percent of occupied dwellings needing major repair.
- C. Percent of occupied dwellings owner-occupied.
- D. Percent of occupied dwellings with 4 rooms or less.

	A	B	C	D
Maritimes	96	14.4	61.5	25.3
Quebec	97	15.8	48.6	35.1
Ontario	95	9.7	69.5	27.2
Prairies	94	17.7	72.4	50.9
British Columbia	95	9.8	69.6	52.7

health and decency. In taking inventory of the housing stock some allowance must be made for this kind of deficiency. One reasonable criterion of inadequacy is the lack of either a toilet or a bath or both; dwellings in this condition are regarded as not "fully serviced". The Census records that in 1941 there were 130,000 dwellings in this category and 171,000 in 1951. These numbers may therefore be subtracted from the effective number in the housing stock.

The general conclusion to be drawn from this information is that in 1951 the number of fully-serviced occupied dwellings was less than the number of families and non-family households by about 492,000. This represents a shortage of about 13 per cent; the equivalent proportion in 1941 was 10 per cent. This conclusion does not necessarily imply that there is an economic demand for this additional quantity of housing; obviously a good many households which are doubled-up or occupying accommodation that is not fully-serviced do not have the capacity to pay for the housing they need. Also there are presumably some families that may prefer to remain doubled-up, even though they have the economic capacity to occupy separate accommodation.

In the production of housing attention is naturally focussed upon the form of shelter required for raising families because this is where the population is generated. The identification of a family with its home is regarded as a stabilizing influence. Consequently about 65 per cent of current urban housing production is in the form of single-family dwellings for owner-occupancy and about 70 per cent of the whole urban stock is in the form of single family houses. However only about 56 per cent of urban housing is in fact occupied by owners, a fact which suggests that there is at present an insufficient production of rental housing, either for families or for non-family households.

The focus of attention upon the production of family housing for owner-occupation has somewhat obscured the requirements of other elements in the population, whose needs have had to be met by adapting the older parts of the housing stock. There is reason to believe that a well-rounded housing programme should contain a proportion of housing suitable for rental purposes, particularly for those households which are not most conveniently and economically housed in single-family houses. Other forms of accommodation such as row housing, apartments and small units for old people would usefully supplement the stock in new residential neighbourhoods.

INVESTMENT IN HOUSING

The initial capital outlay which finances the housing programme in Canada is derived from government, from lending institutions and other credit agencies and from those who build and buy houses.

More than half this whole capital outlay in 1951 was in the form of owners' equity. Part of this equity was taken from available cash and part was raised by personal short-terms loans and by the sale of assets such as bonds, stocks or real estate. Of this whole capital outlay made by the owners of new housing about half was used for the full financing of housing; the other half was put up as partial payment on housing for which mortgage loans were made to cover the remaining cost.

The amount of capital provided by lending institutions in 1951 was about one quarter of the total funds. In the table opposite, this is divided into "conventional" loans and into the loans made jointly with the Central Mortgage and Housing Corporation under the National Housing Act. This share in financing is more important than the proportion itself would suggest because a considerable proportion of owners' private funds would not have been forthcoming if this mortgage money had not been available. This is particularly true of the funds in joint loans because owners' equity is a relatively small proportion of the capital invested in housing financed under the National Housing Act.

The mortgage funds advanced by lending institutions in 1951 amounted to \$197 million. This investment brought in an additional \$64 million as the federal government's share of joint loans and \$152 million in the form of owners' equity. The sum of these amounts, \$413 million, is almost half all the capital invested in housing during the year. It is clear therefore that the lending institutions occupy a pivotal position in the financing of Canada's house building. The judgements that are made by representatives of these institutions, with regard to the design of housing, the type and size of accommodation, play an important part in determining the kind of environment in which Canadians live.

In addition to its share in joint loans under the National Housing Act the federal government invests in housing in a number of different ways. It makes direct loans in areas where institutional loans are not available, it provides funds for farm housing and it constructs housing for the armed services. The federal government is also sharing with provinces the costs of housing built under the terms of Section 35 of the National Housing Act.

SOURCES OF FUNDS IN 1951

Government

Direct Construction.....	\$ 49.0	5.8%
Direct Loans.....	35.6	4.2
Joint Loans.....	65.3	7.8

Lending Institutions

Joint Loans.....	137.7	16.3
Conventional Loans.....	59.1	7.0

Other Loan Sources.....	44.0	5.2
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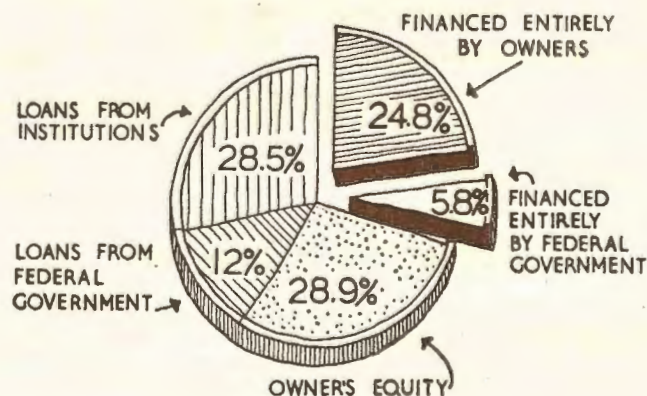
Owners' Equity

Government Joint Loans....	91.4	10.8
Government Direct Loans...	6.6	.8

Lending Institution

Conventional Loans.....	60.1	7.1
Other Loans.....	86.1	10.2
Fully financed by Owner....	209.3	24.8

\$844.2 100.0%



SOURCES OF FUNDS FOR BUILDING HOUSES (1951)

THE NATIONAL HOUSING ACT, 1944

is administered by the Central Mortgage and Housing Corporation through its Head Office in Ottawa, five Regional Offices and 29 Branch Offices. The Act provides a number of different kinds of aid to the production of housing.

PART I Sections 4-7

Home-Ownership Loans

Loans up to 80% of an agreed sale or contract price are made jointly with approved lending institutions to builders, co-operatives and to individuals. The rate of interest is $5\frac{1}{4}\%$ per annum and the term of the loan is generally 20 years. Repayment is by monthly installments.

PART II Section 8

Rental Housing Loans

Loans up to 80% of the lending value are made jointly with approved lending institutions to builders or investors. The interest rate is $5\frac{1}{4}\%$ per annum and the term of the loan is generally 20 years. Single-family dwellings, semi-detached dwellings, row housing and apartment accommodation may be financed under this section. Repayment is by monthly installments.

PART II Sections 8A and 8B

Rental Insurance

Section 8A enables CMHC to enter into a contract to guarantee an annual return of rentals for approved housing projects for a period up to 30 years. Section 8B provides for direct loans by lending institutions up to 85% of the lending value of rental housing projects where such a guarantee of rentals has been given by CMHC. Projects must have a minimum of eight units and the term of the loan may be up to 20 years. Repayment in each year of the term is $2\frac{1}{2}\%$ of the principal advanced with repayment of the balance of principal at the end of the term.

PART II Section 9

Limited-Dividend Loans

Loans up to 90% of the lending value of approved low-rental projects are made by CMHC to housing companies with dividends limited to 5% per annum or less. The interest rate is $3\frac{3}{4}\%$ and the period of the loan may be up to 50 years. Repayment is by annual, semi-annual or monthly installments.

PART II Section 9A

Loans to Primary Producers

Loans up to 80% of the lending value of approved rental housing projects for employees of industries engaged in mining, lumbering, logging or fishing are made at an interest rate of $4\frac{3}{4}\%$ per annum with the term of the loan not exceeding 15 years. Repayment is by annual, semi-annual, quarterly or monthly installments.

PART III Section 14

Rural Housing

Loans up to \$8,000 are made to farm-owners for new housing. The interest rate is $5\frac{1}{4}\%$ per annum and the term of the loan may not exceed 20 years. Repayment may be by annual, semi-annual or monthly installments.

PART VI Section 31A

Direct Loans

CMHC may make direct loans in certain areas where joint financing is not available through lending institutions. The loans are made on the same terms and conditions as joint loans.

PART VI Section 35

Land Assembly

CMHC may undertake jointly with the government of any province projects for the acquisition and development of land to be used for housing purposes. The capital cost of such projects and the profits and losses are to be shared 75% by CMHC and 25% by the province (or some part of the province's share may be assumed by a municipality).

PART II Section 12

Slum Clearance

The Minister of Resources and Development, with the approval of the Governor-in-Council, may make grants to municipalities to assist in the clearance, replanning, rehabilitation and modernization of slum areas.

PART VI Section 35

Public Housing

CMHC may undertake jointly with the government of any province, projects for the construction of housing for sale or for rent. The capital cost of such projects and the profits and losses are to be shared 75% by CMHC and 25% by the province (or some part of the province's share may be assumed by a municipality). (Rental housing remains the property of federal and provincial governments, administered by a local housing authority, with rents set by agreement.)

COST OF HOUSING

The cost of a new dwelling is composed of a number of items each one of which varies according to location and circumstances. A representative single family dwelling of modest size involves a capital outlay of about \$10,000, about 10 per cent of which is spent upon the land and the installation of services to operate the house. (These land costs are shown in detail on page 15.) The remaining \$9,000 is absorbed in materials, labour and the return to the builder for his management of the work.

Since few people are able to provide the whole capital cost from their available assets, mortgage financing of one kind or another is used in payment for most privately-owned houses. Under the most favourable terms available under the National Housing Act the mortgage on a \$10,000 dwelling could amount to as much as \$8,000, at an interest rate of $5\frac{1}{4}$ per cent calculated semi-annually, payments to be made over a 20-year period. To obtain this mortgage a purchaser must make a down payment of \$2,000.

To make payments on the mortgage and to maintain the property the owner's costs are close to \$1,000 a year. If it is assumed that a householder may reasonably spend about one-fifth of his income on shelter, the owner of such a house should have an annual income of nearly \$5,000. If a larger cash payment can be made, the annual costs are reduced; but the costs of taxes, repairs, maintenance and fire insurance are constant, regardless of the amount of the mortgage.

While the annual and monthly outlays on homeownership can be thus calculated in advance, it is not possible to foresee the ultimate capital cost to the owner. At the end of a 20-year amortisation period the owner is in full possession of a property the value of which could not have been exactly determined in advance. This may depend upon real estate values as a reflection of general economic conditions. It may also depend upon the quality of the house itself and of the environment in which it has been set. Housing design should be aimed to preserve intact and enhance values by the use of building forms that are simple and permanent; houses embellished with features of immediate sales appeal are likely to be the least attractive in a generation's time. The protection of the environment through sound community planning may be an equally essential factor in the ultimate value of property.

COST OF A NEW DWELLING

Capital Cost

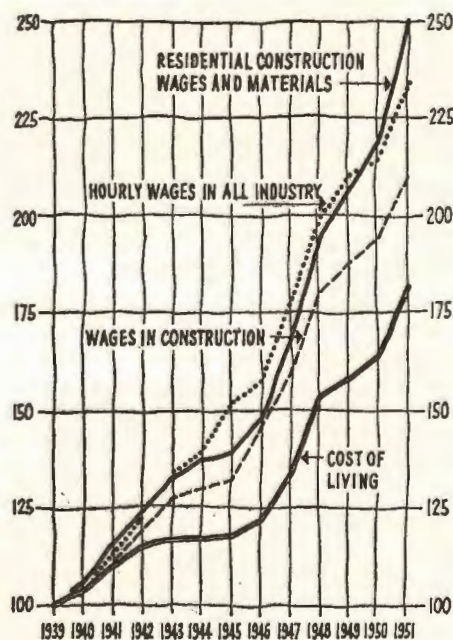
Serviced Land.....	\$1,000
Building Materials.....	4,725
Labour.....	3,375
Builder's Profit and Overhead.....	900
Total.....	\$10,000

Annual Cost

assuming an \$8,000 mortgage
under the National Housing Act

Average amortisation of Mortgage over 20 years.....	\$ 400
Average Mortgage interest payment at $5\frac{1}{4}$ per cent per annum.....	235
Allowance for property taxes.....	240
Allowance for repairs and maintenance..	120
Fire Insurance.....	30
	\$1,025

Monthly Cost equivalent \$82.50



GRAPH SHOWING CHANGES IN THE COSTS OF
BUILDING MATERIALS AND LABOUR

PLANNING CODES

Building Standards

The design, the construction and the costs of housing are limited by the standards of accommodation and land-planning imposed by various codes and regulations. Minimum floor areas and densities of development are required to protect the health and safety of the population and also to protect investment in housing. The codes also reflect current social conventions and represent a standard of housing which is considered to be a reasonable attainment for Canadian living. Codes of housing practice become increasingly necessary as more people are concentrated within urban areas.

For housing financed under the National Housing Act manuals of building standards for single houses and for apartments are published by the Central Mortgage and Housing Corporation. These standards apply except where provincial or municipal building codes are more exacting.

Community Planning

Through the powers granted to them by provincial statutes, municipalities are able to control the development of land. In all provinces except Quebec and Newfoundland these powers are consolidated into Planning Acts which define the powers and procedures to be used.

The Official Plan is the term commonly used for a scheme of development prepared by a Planning Board or Commission and adopted by a municipality (or group of municipalities) as a guide to future decisions in the process of urban growth. Such a plan may show the systems of thoroughfares, of parks and open spaces, of utility services and the location of schools and other community buildings. An Official Plan should also outline the general scheme of land-use to be embodied in zoning regulations.

Zoning is the division of a municipal territory into defined areas in each of which certain uses are prohibited and others are permitted. Zoning may also determine the density of development and so create a pattern of development and diversity for residential areas. Zoning is a legal procedure based upon the adoption of municipal bylaws and supported by a court of appeal to deal with cases of hardship and adjustment.

Subdivision Control is usually exercised by provincial governments with the advice and collaboration of municipal Planning Boards. Originally intended to achieve a proper recording of land ownership, this procedure has been extended into a method for controlling the size and shape of building lots, for integrating the street pattern and for preventing the subdivision of land which is unsuitable for urban use. The effective control of subdivisions also enables a municipality to supervise the process by which utility services are extended to new urban areas.

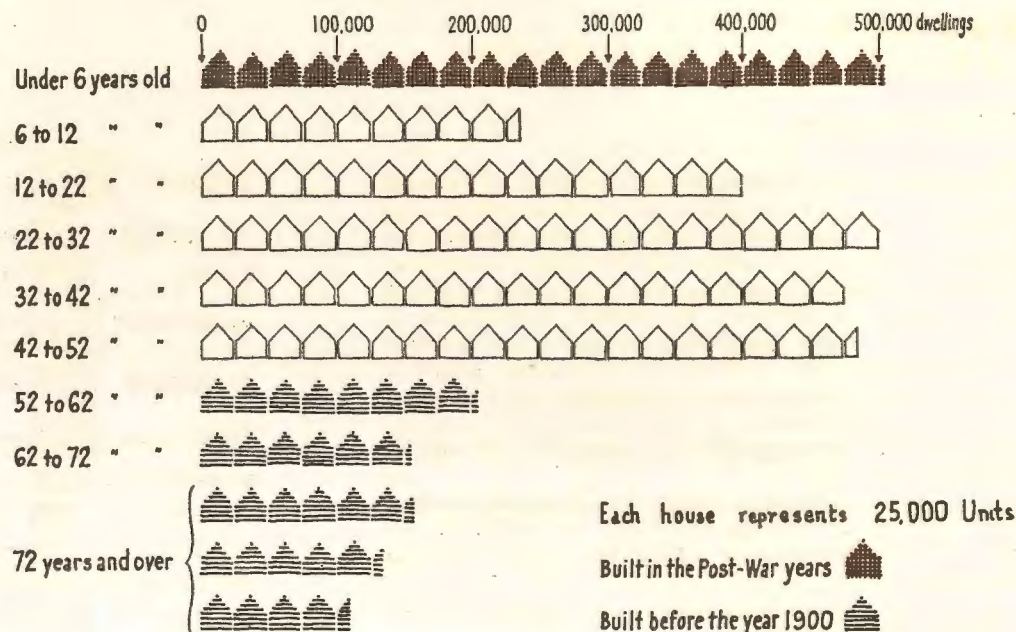
	minimum areas
LIVING ROOM	= 150 SQ. FT.
DINING SPACE	= 40 " "
KITCHEN	= 50 " "
MAIN BEDROOM	= 110 " "
2ND BEDROOM	= 80 " "
3RD BEDROOM	= 80 " "
5 CLOSETS @ 6 SQ. FT.	= 30 " "
BATHROOM	= 33 " "
VESTIBULE	= 12 " "
MINIMUM SPACES BY BUILDING STANDARDS TOTAL: 585 SQ. FT.	
HALLWAYS	= 30 SQ. FT.
AREAS OCCUPIED BY WALLS	= 140 " "
STAIRWELL	= 40 " "
MINIMUM CIRCULATION AND WALLSPACES TOTAL: 210 SQ. FT.	
TOTAL MINIMUM AREA: 795 SQ. FT.	
@ \$10. PER SQ. FT. = TOTAL MINIMUM COST: \$7950.	

The minimum cost of a new house is limited by the amount of space that must be provided in order to qualify for a mortgage loan.

COMMUNITY PLANNING LEGISLATION

British Columbia	Town Planning Act	1948
Alberta	Town and Rural Planning Act	1942
Saskatchewan	The Community Planning Act	1945
Manitoba	The Town Planning Act	1940
Ontario	The Planning Act	1950
Prince Edward Island	The Town Planning Act	1945
Nova Scotia	The Town Planning Act	1939
New Brunswick	The Town Planning Act	1936

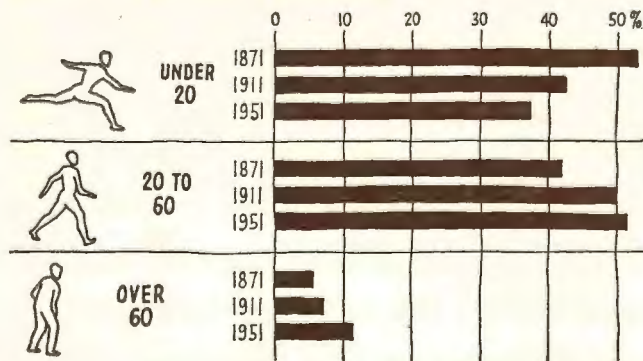
The age and obsolescence of the housing stock in 1952.



YOUTH and AGE

There is a cycle in the life of housing. It is created, it has its years of active use, it deteriorates, it must be replaced. We have inherited a stock of housing much of which is already obsolete, not only on account of physical deterioration but because it was originally designed to fit social and economic circumstances that no longer exist.

A century ago the average household size in Canada was 6.18 persons, fifty years ago it was 5.03 persons and now the average size is 3.9 persons. In a previous period family households not only contained more children but they also included individual adults who remained within the family group. It is a characteristic of to-day's urban society that individual adults separate themselves to form other households; these are either young working people or old people whose families have been dispersed. This change in social habits is supported by the development of restaurants and other city facilities and is accentuated by the limited size of the contemporary four and five room family house.



A striking feature of the present population, as compared with previous generations, is the increased proportion of old people. Many of them naturally occupy single houses which they acquired during the period of life in which they were raising a family; but it is becoming evident that there is an increasing need to provide old people with a kind of accommodation which would be more convenient for their use. This would release some houses for family use and would also remove single old people from lodgings and hospitals where they have had to resort for want of more suitable housing. While it is neither desirable nor possible for them to live with the families of sons and daughters, it is considered advisable for old people to remain within the neighbourhood environment of family life.

To a considerable extent the housing needs of separated individuals have been met by adapting the older parts of the housing stock, particularly the eight and ten room houses which fitted the larger households of a previous generation. Socially this has had the disadvantage of segregating young adults and old people in the older parts of cities, separated from normal neighbourhood society in the suburbs. In many Canadian cities the conversion of the stock of larger houses has temporarily postponed both the process of replacement and also the latent need to provide rental housing for non-family households. These circumstances may not be repeated; for our present product of small family houses will not in the future lend itself to a similar adaptation.

Assuming that 50 years is a reasonable life-span for an urban dwelling, it would be necessary to replace about 2 percent of the housing stock each year to keep it in good order. If we do not build well, with both the future as well as the present in view, a time may come when the building of replacements will have to be as large an operation as the provision of new housing for a growing population.

A community contains a diversity of people, a variety of household sizes and circumstances, a continuous flow in the cycle of life from youth to old age. A corresponding diversity is required in the stock of housing accommodation. Variety is the spice of life and housing design should express those variations within society which are essential to its vitality.

In the following pages there are illustrated some contemporary examples of housing design in which there has been an attempt to provide a reasonable diversity of accommodation and building forms. Each of these examples contains both family housing and also accommodation for smaller households, arranged on the site so as to give interesting and contrasting architectural compositions. Single houses, row housing and apartments are blended together into community groups.

There is an inevitable conflict between the influences towards uniformity and the striving for diversity and individuality. Even in the smallest housing project of the speculative builder there is often an attempt to resolve this conflict. It is economical to build a number of houses to the same plan, using standard dimensions and materials. But a response to the demand for individuality usually compels the builder to disguise this uniformity with different colours and different details of windows, doors and roofs. Though these variations may add to the cost and frequently spoil the simplicity of good design, yet they are a genuine response to the need for individual expression. This constant striving for individuality is indeed one of the principal reasons why housing has not been mass-produced like other products of the industrial age.

The influences tending to create monotony and uniformity are deep-seated. The mass-production of materials, the equalization of wages and the system of common education within which we live all tend to mould people to similar tastes and habits of life. It is inevitable that the requirements for housing accommodation become stereotyped. Building codes, municipal bylaws and the regulations of mortgage financing all tend to impose a uniformity of pattern on houses and their layout. The methods of land subdivision, too, and the marketing of real estate are reduced to the simplest and most profitable routines when the stereotyped grid-iron

street plan is used. Even the whole system of zoning, which is intended to benefit community planning, has too often been applied in such a way as to segregate housing into districts of uniform character. Though each of these influences towards uniformity has originated and been applied for a proper social purpose, the collective result has been the monotonous and rigid character of new housing areas.

There is consequently a particular value in the experiments that have been undertaken to break this monotony by designing housing developments containing a diversity of building forms. The real diversity

of a community's housing needs offers a rational basis for housing architecture. The contrasting forms of single houses, row housing and apartments can be used to create groups of buildings that have individuality and character. Simplicity of form and economy of construction may then have a positive design value rather than seem to require artificial and expensive variations. The few successful experiments in this direction have now indicated that this is a justifiable aim of housing design, in spite of the difficulties inherent in changing established practices.



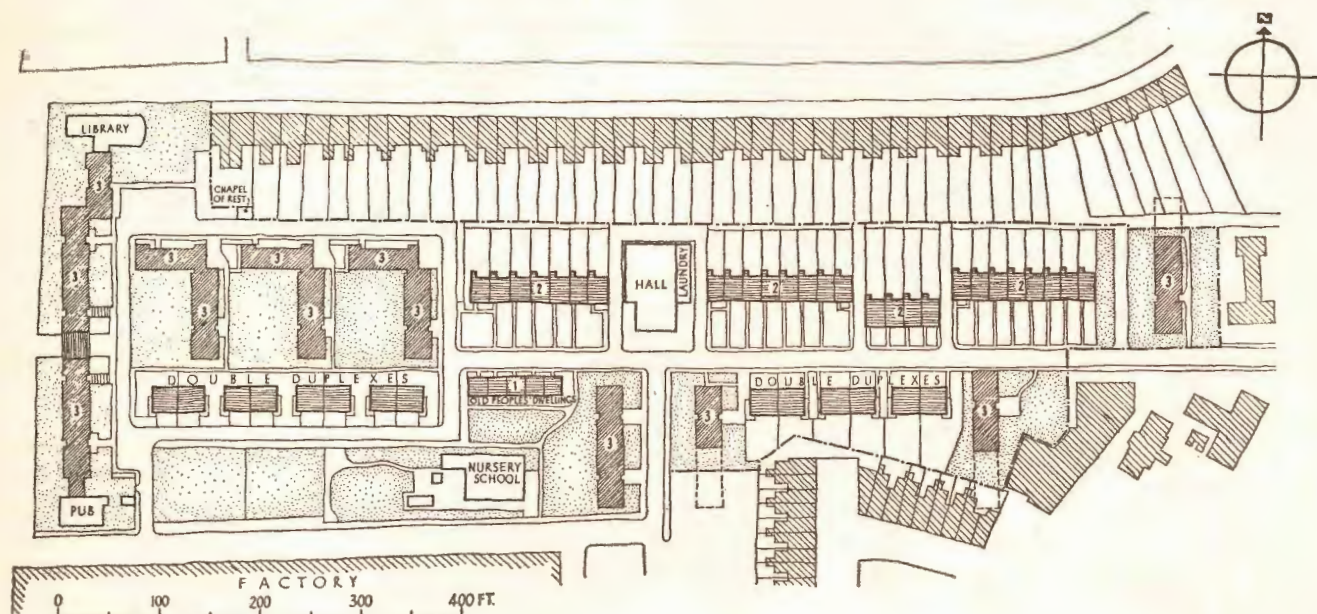
HAMPSTEAD GARDEN SUBURB London, England

An area of 243 acres adjoining Hampstead Heath was purchased in 1906 by the Hampstead Garden Suburb Trust Ltd., a further 400 acres being added later. The estate was planned by Sir Raymond Unwin and Barry Parker who had recently designed the Garden City of Letchworth. Essential features of the scheme as conceived by Dame Henrietta Barnett were that persons of all classes of society and standards of income should be accommodated and that housing should be limited to a density of eight to the acre. The housing was built by Co-Partnership Tenants Ltd. and includes single houses, row housing and a few flats. The churches and the community institute on the Central Square were designed by Sir Edwin Lutyens while other distinguished architects of the Edwardian period contributed the designs of individual houses.

SOMERFORD GROVE ESTATE

Shacklewell Road, Hackney, London

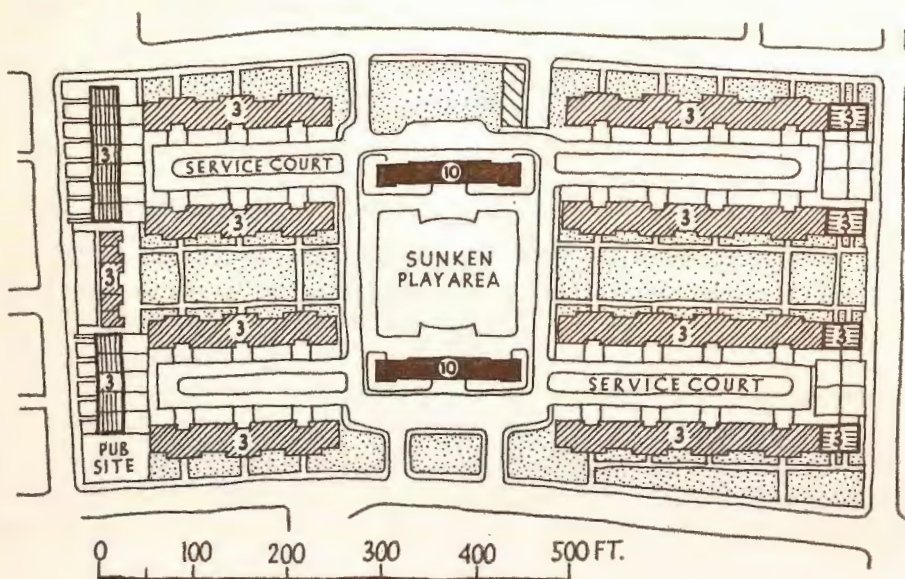
Designed by Frederick Gibberd, architect, and G. L. Downing, borough engineer, the scheme includes row houses for large families, two-storey flats for medium-sized families, apartments in three-storey blocks for small families and bungalows for old people. There are a community hall, library, laundry and nursery. The several types of buildings have been grouped to enclose a series of small open spaces, each with its own individual character.



HENRY DICKENS COURT

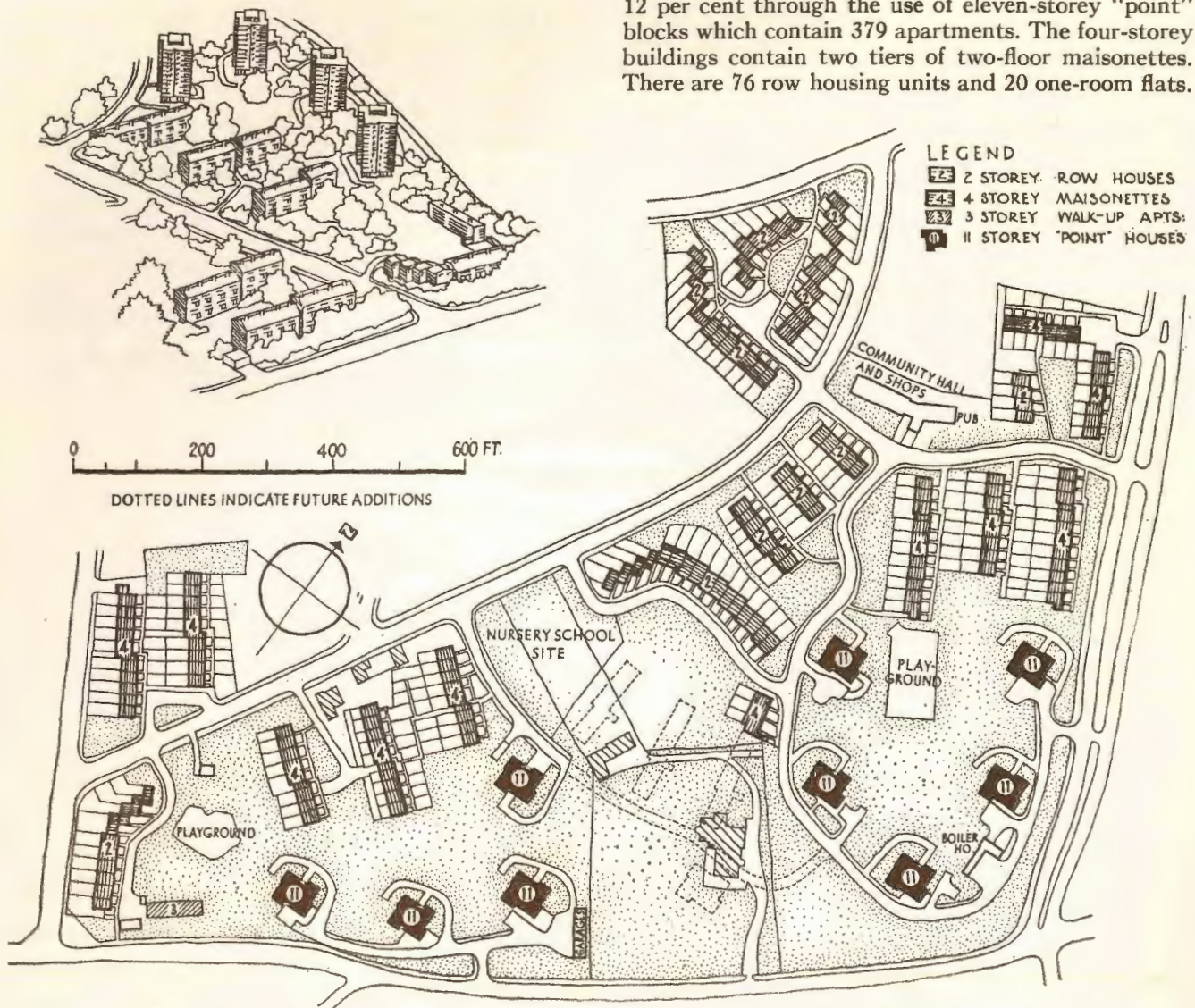
North Kensington, London

Designed by Edward Armstrong and Brian O'Rorke, architects. This redevelopment project of 300 dwelling units, at 136 persons to the acre, provides ten-storey blocks to house families of two to four persons, flats for families of four to six persons, three-storey row housing for larger families and one-room flats for old people.



PORTSMOUTH ROAD HOUSING Roehampton, London

Designed by H. W. Lewis and Robert Matthew, architects to the London County Council. The 25 acre site with 655 units has a land coverage of only 12 per cent through the use of eleven-storey "point" blocks which contain 379 apartments. The four-storey buildings contain two tiers of two-floor maisonnettes. There are 76 row housing units and 20 one-room flats.



DIVERSITY OF HOUSING

In the period between the wars British housing took the form either of high-density redevelopment in central areas or cottage housing in the suburbs, particularly semi-detached and row housing. In the suburbs a uniform density of 12 houses to the acre had come to be regarded as a means of emulating the character of the Garden Cities, accepted as models. However, the monotonous effect that resulted was severely criticized and led to a reconsideration of the true purposes of the Garden City movement as it had originated through the inspiration of Ebenezer Howard at the turn of the century. The essential feature of his

doctrine was the satellite town as a self-contained community, housing a completely diversified population.

Consequently in the recent post-war period the character of British housing has taken a new turn. Not only has the building of a series of New Towns been undertaken as a means for containing the expanding urban population but many other individual housing estates have assumed a more civic character, under the influence of the published New Towns designs. This civic character has been achieved through the use of multiple housing blocks judiciously sited in relationship with low-density family housing.

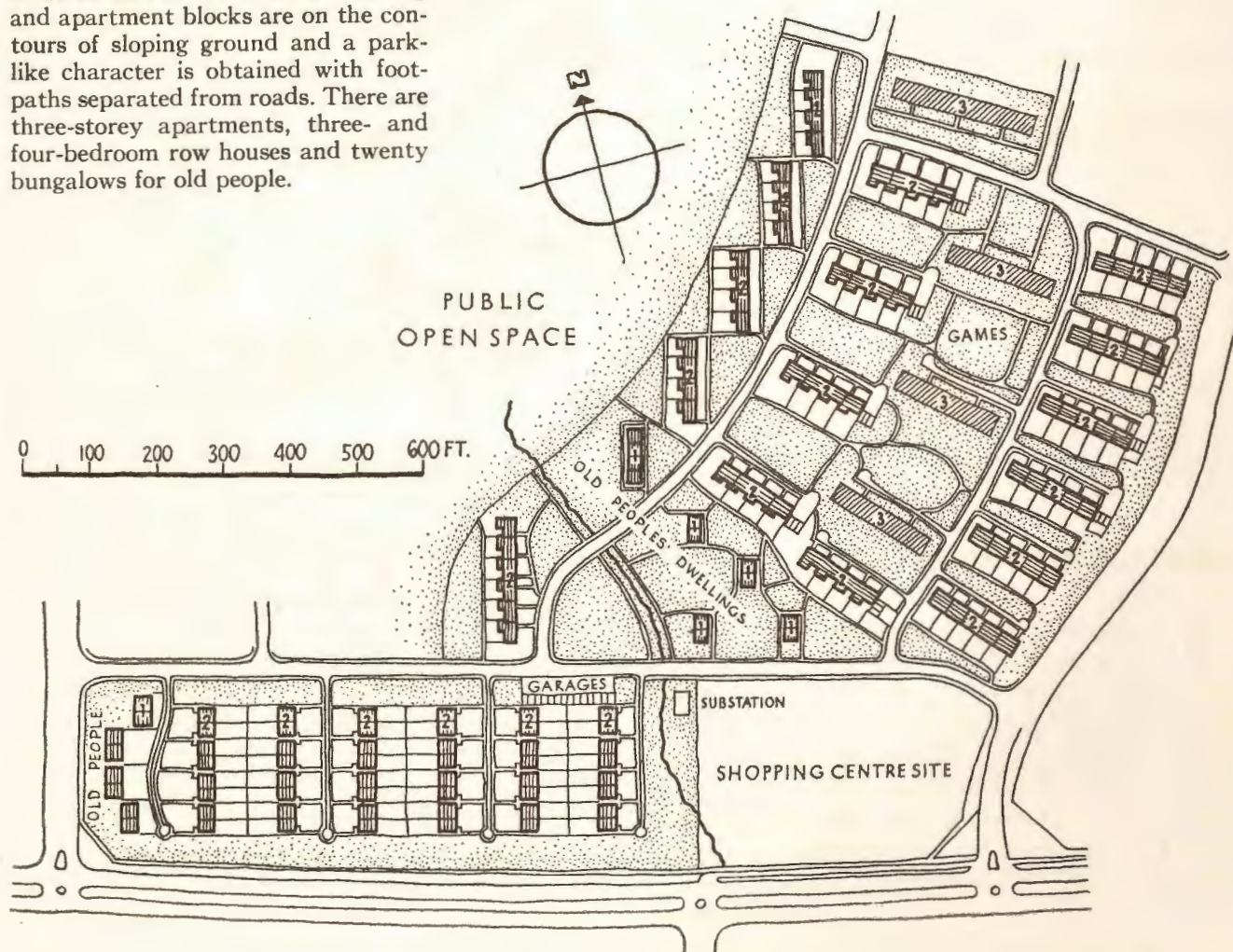
Instead of concerning himself only with the flat plan of streets and houses, the housing designer has examined in depth the social requirements of the population to be housed and has translated these requirements into three-dimensional architecture. The proportionate numbers of various sizes and types of household have set the programme for the designer. This is, of course, a procedure which it is possible to apply with some precision in the design of large housing estates, publicly owned; it cannot so easily be applied under conditions of private development. The principle, however, is an important one that can, in modified fashion, be introduced into all residential

development through the instruments of community planning.

Another feature of post-war British housing that can be observed in the examples illustrated is the grouping of buildings to enclose small spaces, "closes" or "greens." There is an attempt to distinguish between the street as a traffic route and the immediate open space on to which each house faces. This is a conscious and studied return to some of the intimacy of the English village with its houses set around the green. To British people the modest scale of the village has always been a more attractive ideal than the larger formality of the city.

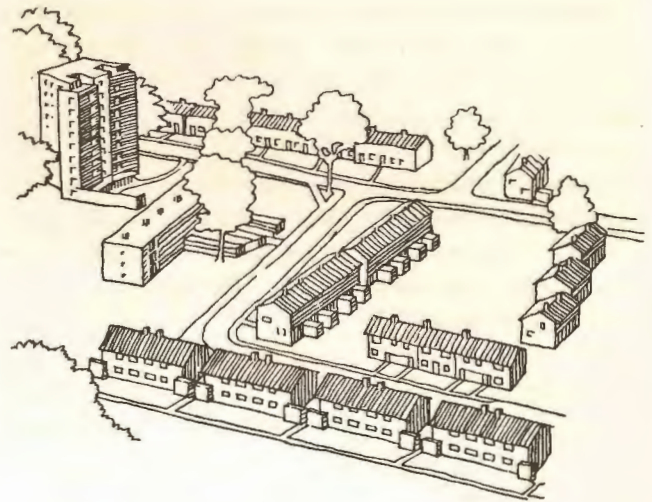
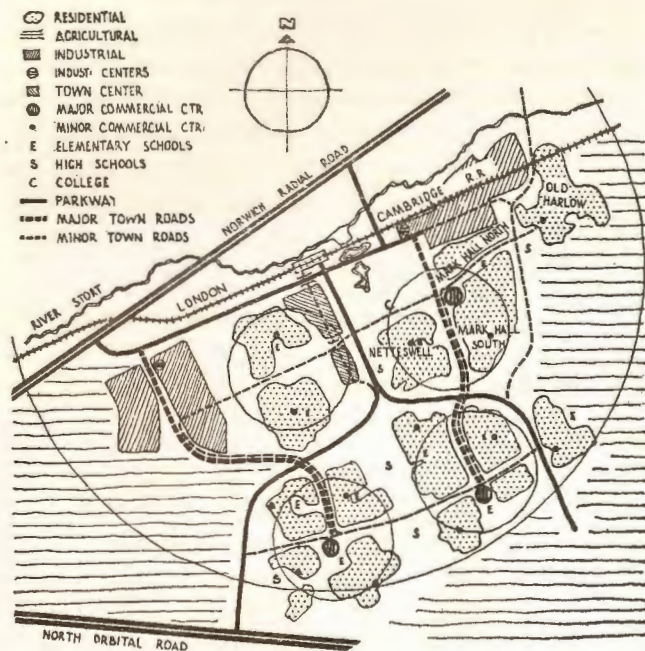
Designed by city architect D. E. E. Gibson this housing estate is a balanced community of 194 dwelling units on 22.6 acres. The row housing and apartment blocks are on the contours of sloping ground and a park-like character is obtained with foot-paths separated from roads. There are three-storey apartments, three- and four-bedroom row houses and twenty bungalows for old people.

STONEBRIDGE HIGHWAY ESTATE Coventry, England

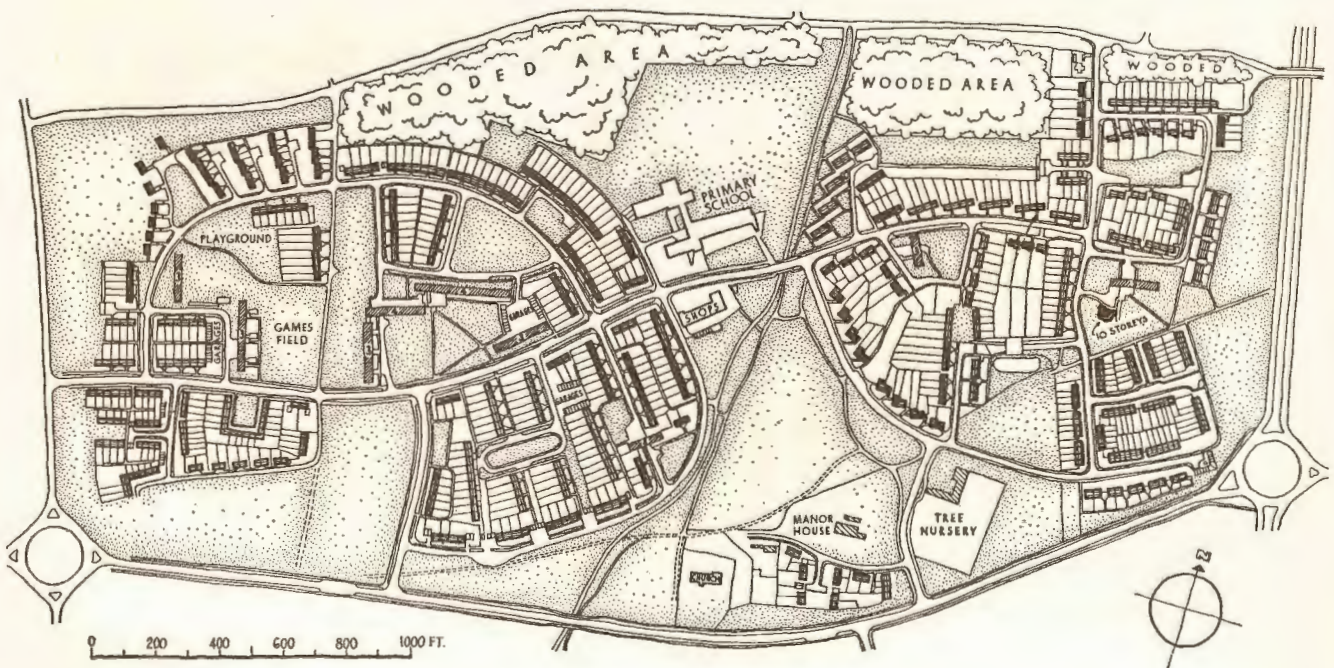


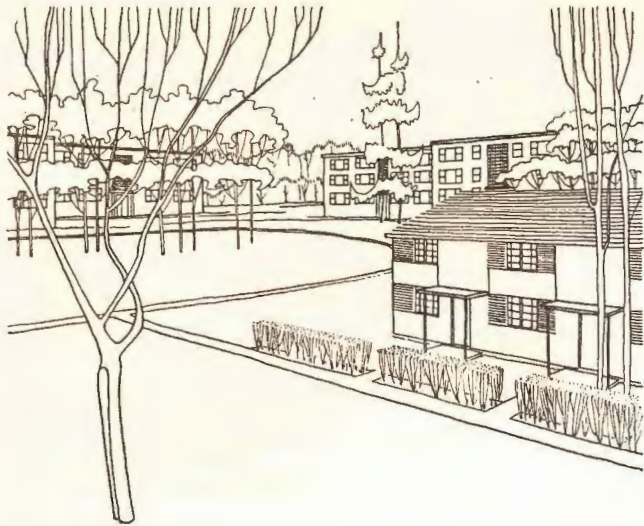
MARK HALL NORTH

Harlow New Town, Essex, England



Harlow is a new town about 23 miles north-east of London now being developed by a government-sponsored Corporation as a self-contained community for a population of about 80,000 on an area of 6,320 acres. Mark Hall North, where building started in 1950, is one sub-neighbourhood within this town planned by Frederick Gibberd with housing designed by Fry, Drew and Partners and other architects. Apartments and houses are in the ratio of one to three. The master plan shows the manner in which the town has been divided into separate parts so as to give each an identity and organization around its community buildings. Each of these sub-neighbourhoods is compactly planned to give urban character within a setting of ample open spaces.

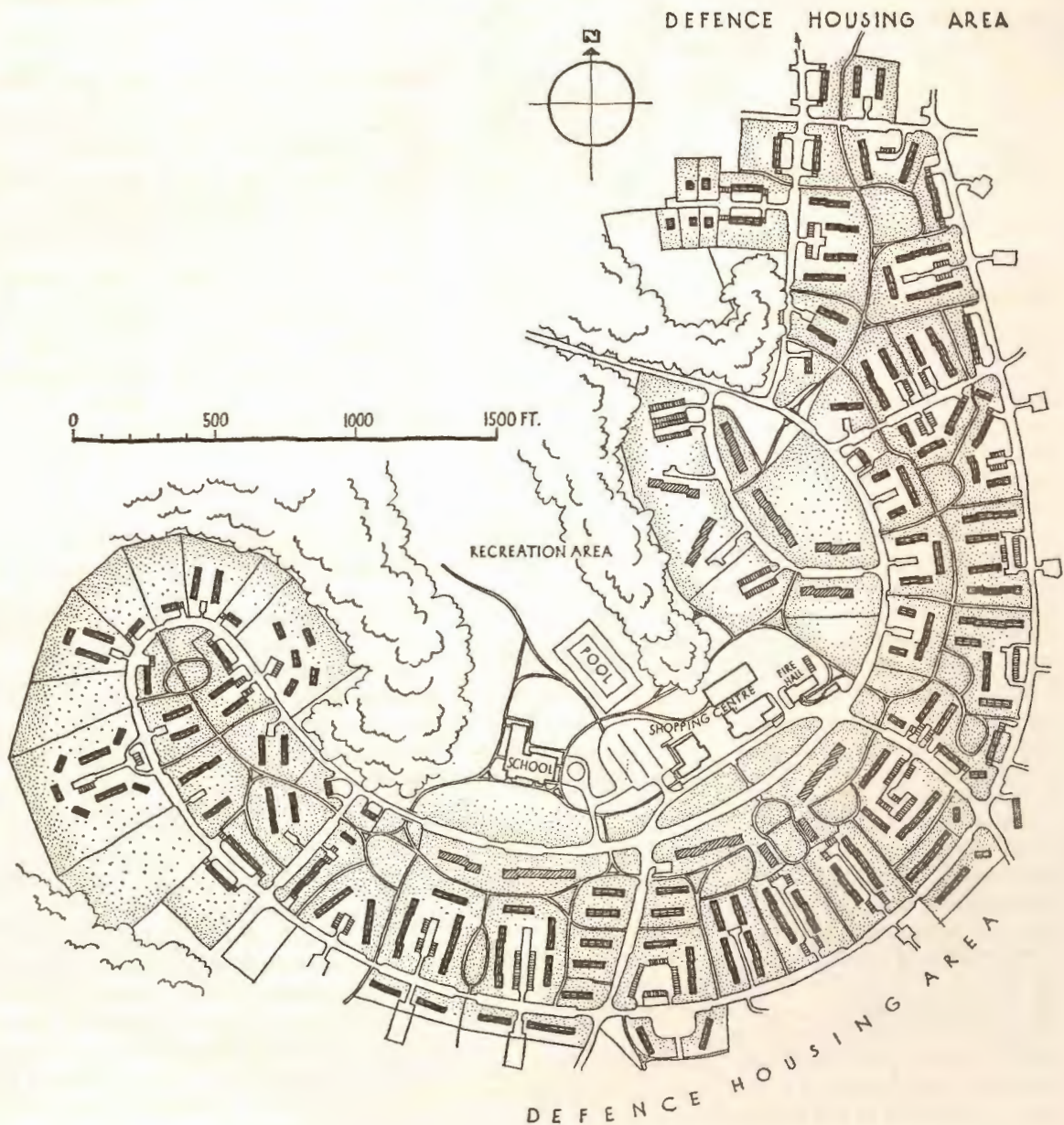


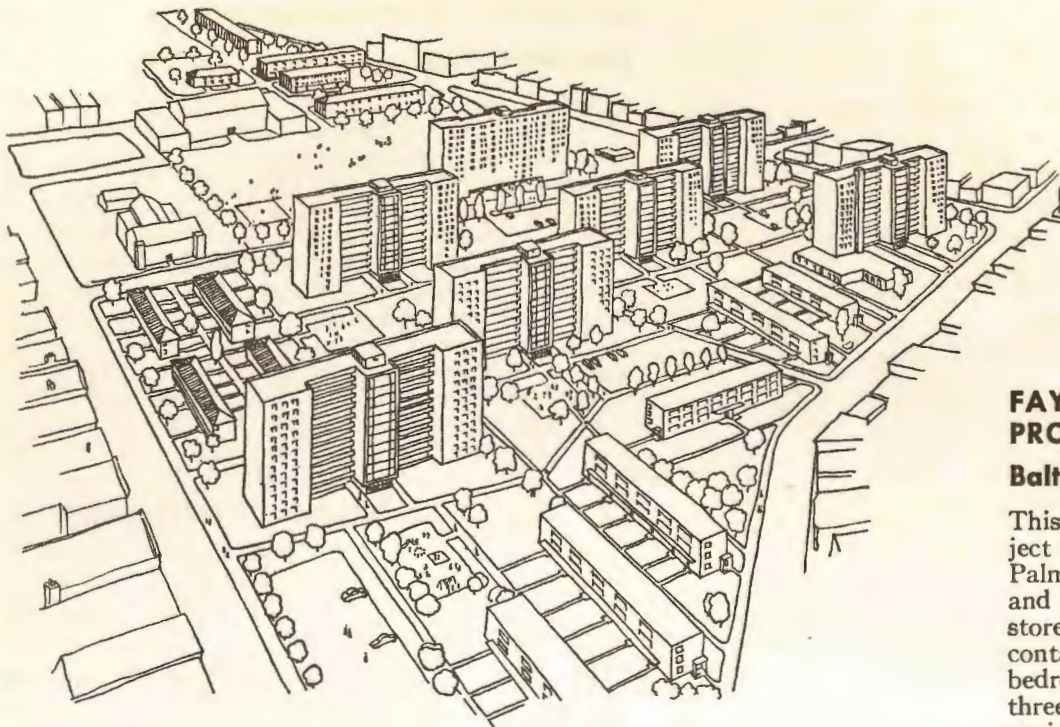


GREENBELT

Maryland, U.S.A.

Designed by Hale Walker, town planner, and architects D. D. Ellington and R. J. Wadsworth, Greenbelt is a residential new town 13 miles from Washington, built between 1935 and 1937 to contain 855 dwellings. One thousand units were added in 1941. Three-quarters of the accommodation is in row housing, 16 per cent is apartments, 8 per cent in flats and one per cent in housing for old people. The town is built on a crescent of sloping land surrounding the park and community buildings. Greenbelt marks a stage in the sequence of experiments employing the type of plan devised by Clarence Stein and Henry Wright at Radburn, N.J.





FAYETTE STREET PROJECT

Baltimore, U.S.A.

This redevelopment project designed by architects Palmer, Fisher, Williams and Nes, provides eleven-storey elevator apartments containing one- and two-bedroom units and half the three-bedroom units in the project. Three-storey buildings have three-bedroom units on the upper floors over flats on the ground floor, all with private entrance. Row housing provides the four-bedroom units.

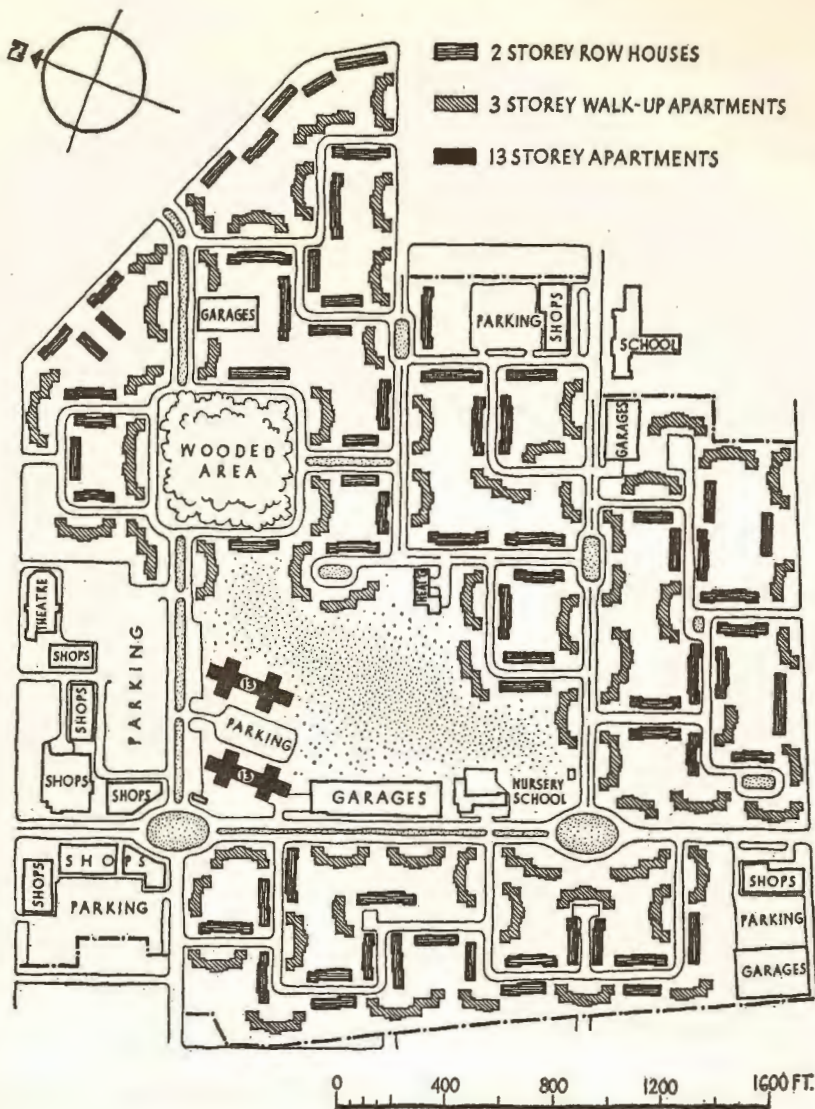
In Canada and the United States the extensive and often premature subdividing of land in advance of urban development has fixed the pattern of housing design. Diversity of housing is difficult to accomplish because the proportions of building lots and street blocks have been based on the assumption of their use for single-family housing; other forms of housing have been regarded as an intrusion upon the amenities of home-ownership districts. Where apartment houses have been introduced they have usually been placed upon standard lots instead of on spaces appropriate for multiple buildings. Land suitable for row housing has not been provided and there has yet been little experience in site-planning for this purpose.

A few large projects in the United States have demonstrated the principles of diversity in housing design. The first notable example is Greenbelt which has historical associations with the Garden City tradition of England, carried out, however, with a freshness of view and freedom of space that belongs to the new world.

Fresh Meadows, a long-term investment of private funds, has been acclaimed as the finest housing development of the post-war period. Like Greenbelt it demonstrates that buildings designed in the simplest and most economical form can be made architecturally effective through careful site-planning and the grouping of contrasting building forms. Like Greenbelt, also, Fresh Meadows demonstrates the great value of landscape treatment, the planting of hedges to enclose open spaces and the planting of trees for shelter and decoration. In each case this has been an essential element in the investment.

Diversity is also evident in some housing projects in slum-clearance and redevelopment areas, such as those in Baltimore. The high cost of land in central areas requires a correspondingly high density of building which becomes inhuman in scale if carried out uniformly. A particularly interesting experiment is being conducted in Philadelphia where some old housing is being restored in the process of redevelopment, to conserve some of the traditional character of an historic city. This provides a form of diversity obtainable in a city built of brick and masonry; though the wood-frame buildings of older Canadian cities do not so easily lend themselves to conversion yet some opportunities will occur for capturing some historic character too easily eliminated in the process of redevelopment.

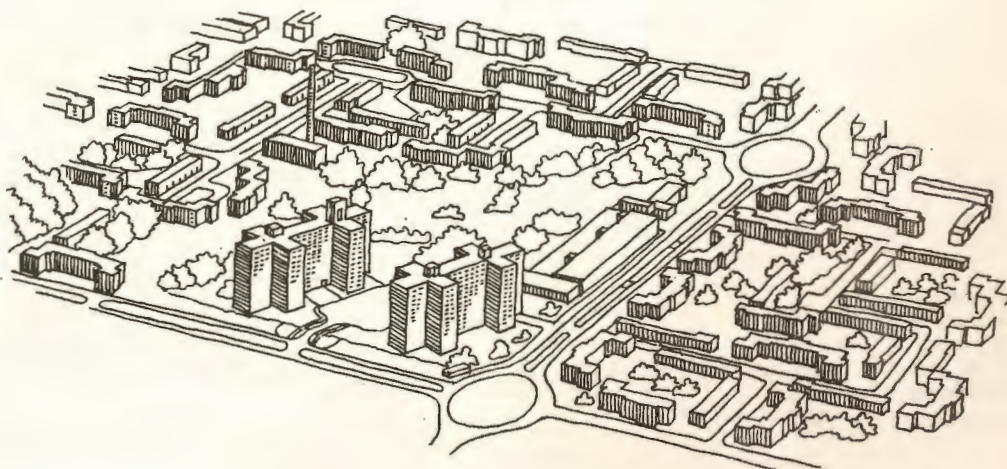
In Canada the opportunities for practising a diversity of housing design may appear most readily in the new towns where virgin territory is opened up by public and private enterprise on land not previously committed to subdivisions that stereotype the form of development. The building of Kitimat on the coast of British Columbia has provided such an occasion.



FRESH MEADOWS

Queens, New York City

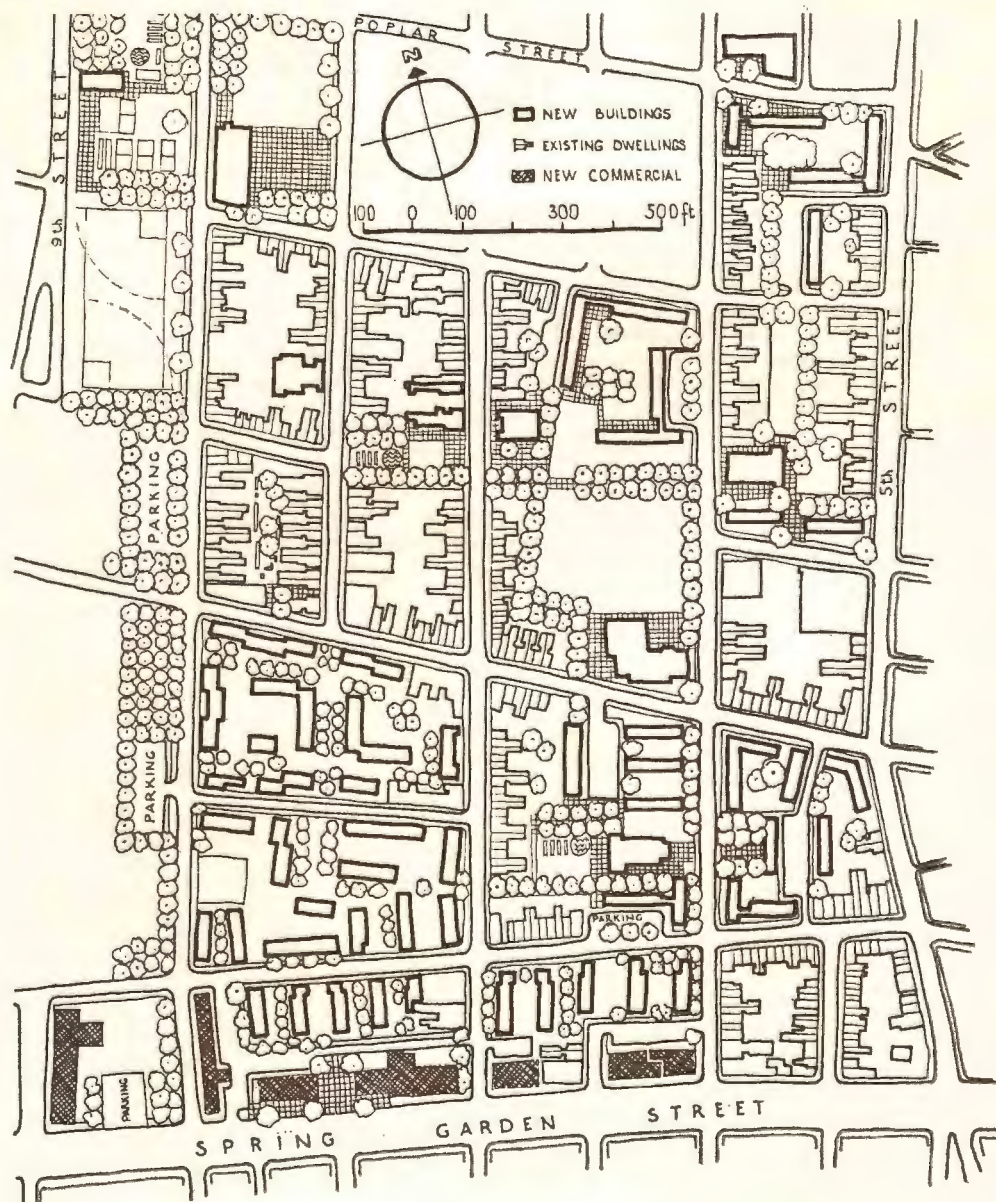
Designed by Voorhees, Walker, Foley and Smith, architects and engineers, Fresh Meadows was completed in 1950 for the New York Life Insurance Company as a self-contained community to house 11,000 people on an area of 174 acres. There are 3,000 dwelling units contained in 70 blocks of row housing, 68 blocks of three-storey walk-up apartments and two thirteen-storey elevator buildings. The two tall buildings stand on the highest point of land as a dramatic focal point in the project, flanked by the shopping centre and an inconspicuous service garage. Only one public traffic artery passes through the development, other streets being in short lengths, planned so that cars must move slowly. Buildings are placed on free open spaces which provide 97 acres of recreation area. The project was planned to provide a variety of units for varying family requirements, from marriage to old age, so that tenants can form roots in the community and not be forced to move out by changing needs for housing space.



EAST POPLAR REDEVELOPMENT

Philadelphia, U.S.A.

The Redevelopment Authority and the Public Housing Authority of Philadelphia, together with a private philanthropic housing agency, are rehabilitating an area in which 60 per cent of the houses are sub-standard but where some structurally sound buildings can be converted to new use. The opportunity to incorporate existing buildings in plans for redevelopment thus extends the concept of housing diversity.

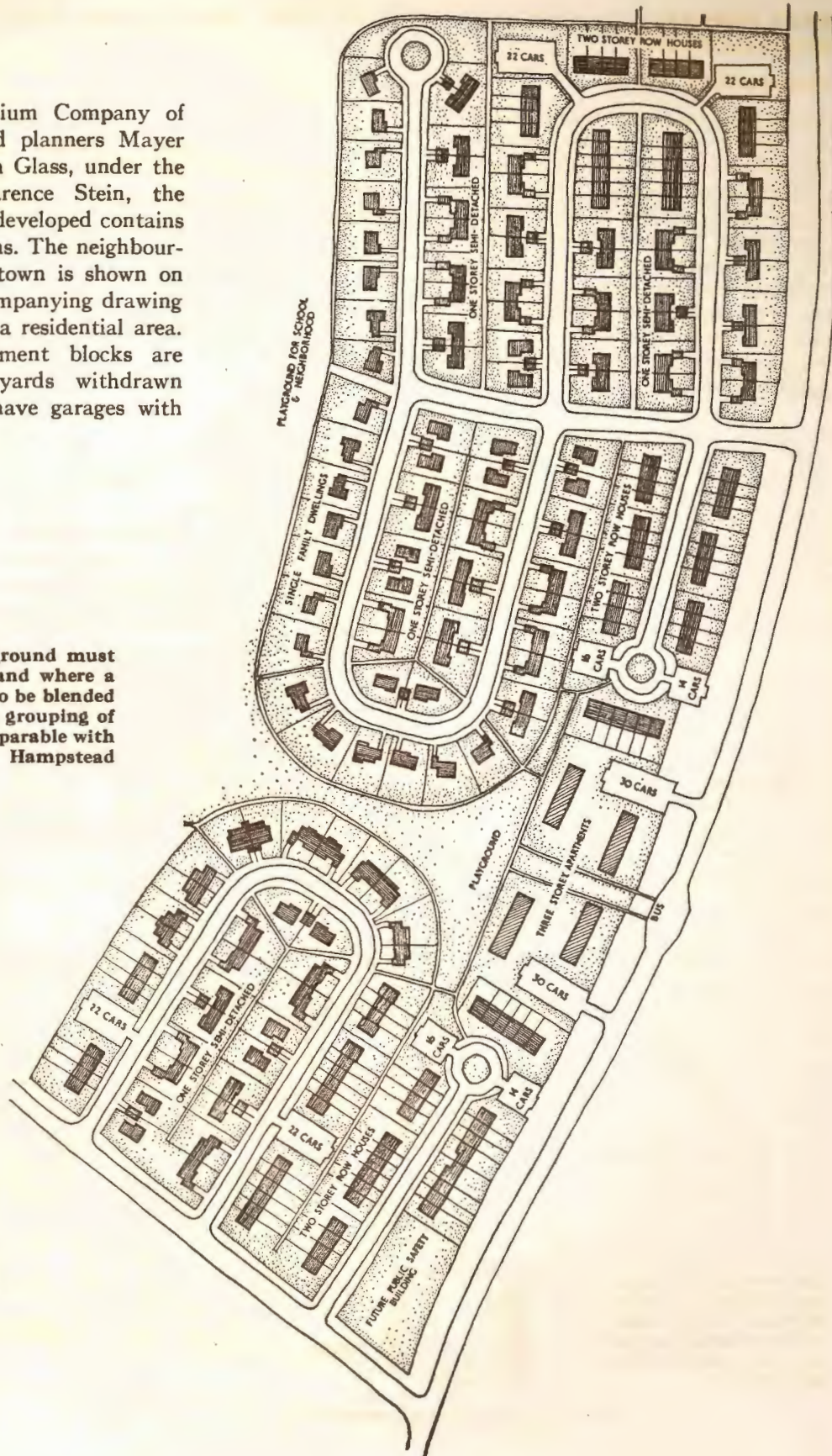


Conservation of existing buildings of architectural quality may enrich diversity of design in redeveloping old cities.

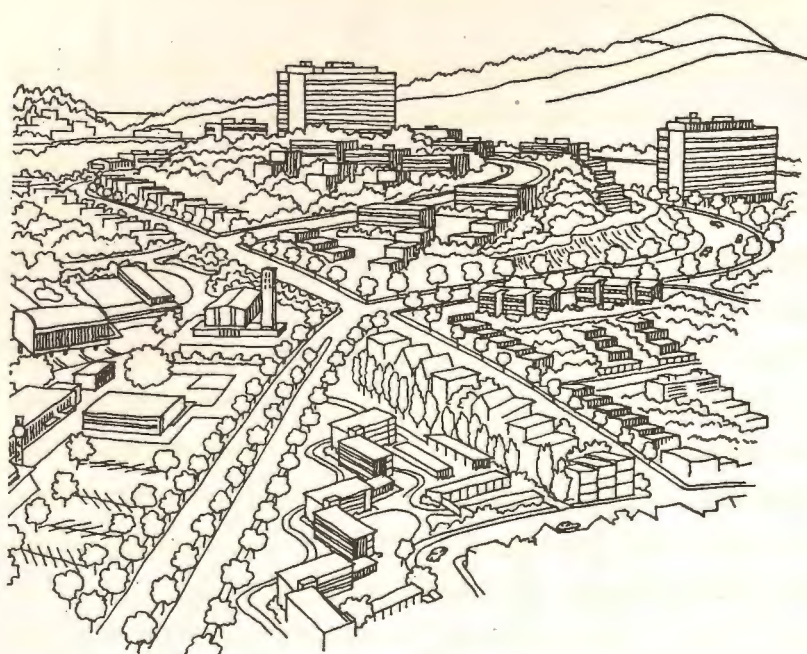
KITIMAT British Columbia

Designed for the Aluminium Company of Canada by architects and planners Mayer and Whittlesey and Milton Glass, under the general direction of Clarence Stein, the first neighbourhood to be developed contains a diversity of housing forms. The neighbourhood organization of the town is shown on pages 78 and 79; the accompanying drawing illustrates a small part of a residential area. Row housing and apartment blocks are provided with parking yards withdrawn from the streets, houses have garages with short driveways.

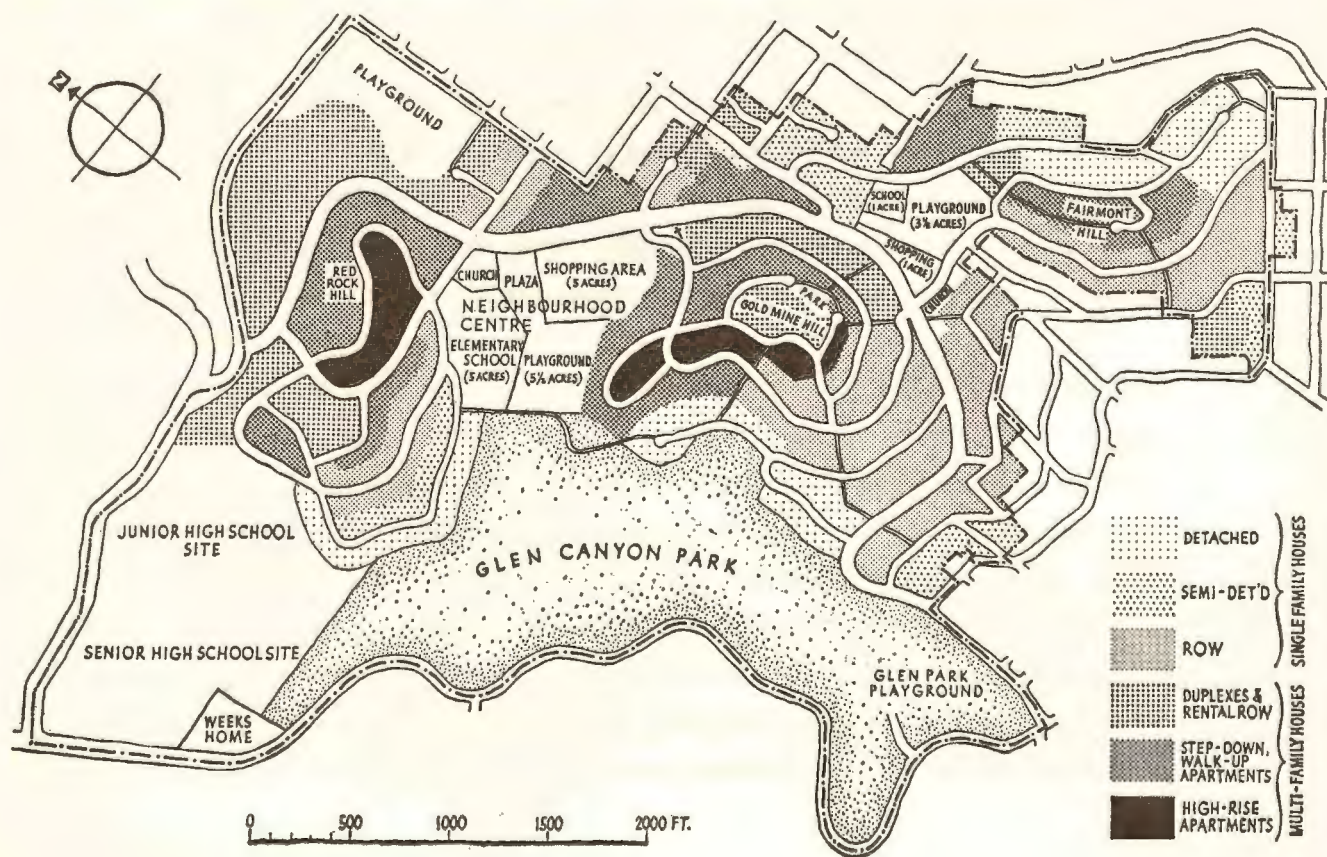
Siting of buildings on the ground must precede the subdivision of land where a variety of housing types are to be blended into a composition. Here the grouping of single houses and rows is comparable with the early experiments in Hampstead Garden Suburb (page 50).



DIAMOND HEIGHTS REDEVELOPMENT PROJECT, San Francisco, U.S.A.



A plan for the redevelopment of an area largely unused on account of an awkward grid-iron plan on steep terrain, was prepared in 1951 by planners Vernon DeMars, Albert F. Roller and engineer E. E. Hutchison for the Redevelopment Agency and Department of City Planning of San Francisco. The proposal illustrates how a system of zoning may be used as a basis for obtaining a diversity of housing within a single neighbourhood area, as compared with the more customary uniform zoning for residential districts. On a site of 325 acres, of which 60 per cent was publicly owned, it is proposed to house a population of about 7,500 in accommodation ranging from single family houses to high-rise apartments. A plan of proposed land-uses provides a general framework within which public and private developers may join together in the creation of a well-rounded community.



The design of housing is inseparable from the design of the whole working apparatus of a residential area. An urban household cannot operate unless it is tied into the circulation system of streets, sewers, water and power. An accessible shopping centre and school are as much a part of the equipment of a home as the kitchen and the bathroom. These community services provide the real core and structure of a neighbourhood.

The cost of constructing streets and ground services becomes part of the cost of a house, whether the cost is collected by a municipality in the form of local improvement taxes or whether it is incorporated in the price of the house and lot. Reductions in cost may arise out of careful designing to give an economical circulation system. The main flow of traffic should be restricted to streets designed for the purpose so that residential streets may be designed to smaller dimensions and lighter surface materials. Similarly sewers and water lines can be most economically designed in direct relationship with the number of dwellings served.

The neighbourhood school is the most expensive item of community building and its accommodation must be tailored to the long-term requirements of the families within each area. The attempt to stabilize the character of neighbourhoods and so retain a constant school population is one of the principal justifications for the neighbourhood system of community planning. The location of each school is a critical element in the plan because there must be uninterrupted pedestrian routes linking residential streets, recreation areas and school buildings.

The siting of schools, shopping centres, churches and other community buildings provides the opportunity to create a focal point in each residential area. A small civic centre or neighbourhood core will be most attractive if there are adequate parking yards so that the buildings themselves may face upon a quiet open space in which pedestrians are free from traffic. This arrangement has been provided in some modern shopping centres built around a central mall. This is an important advance upon the customary ribbon of shops along a busy traffic street and suggests a new type of neighbourhood precinct. A number of residential areas illustrated on these pages exemplify the neighbourhood core; this is undoubtedly an important element in restoring some civic quality to our cities of the industrial age.

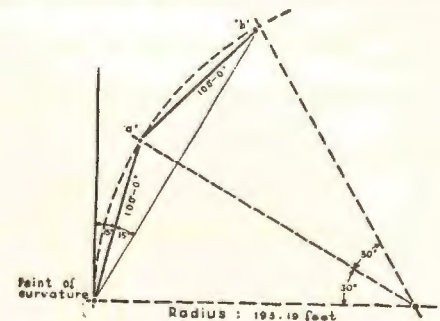
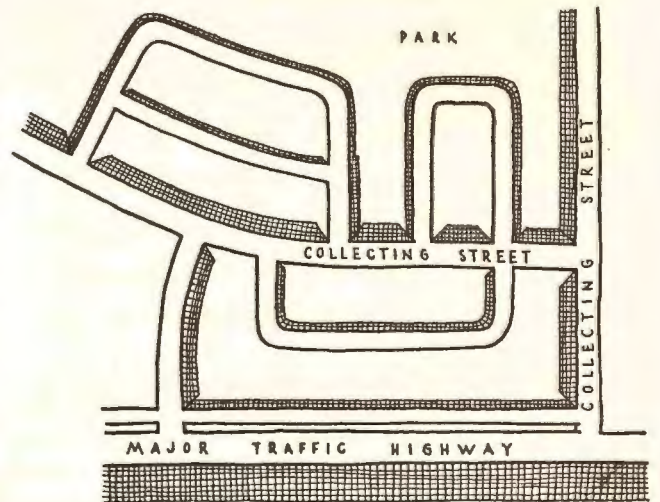
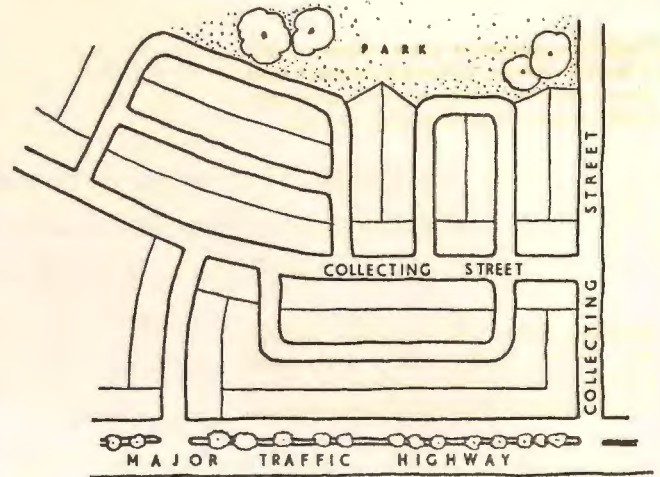
Street Layout

In setting out the street system of a residential area the planner must anticipate the task of the engineer who will design the sewers and water mains. The first sketches of the plan should arise out of an appreciation of the shape of the ground, the adjacent street pattern and the problems involved in distributing services throughout the area.

The flow of traffic on a street can be compared with the flow of water in a pipe. A circulatory system, with progressive subordination of main arteries, local circulation routes and short access streets makes it possible to anticipate loads and design accordingly. The universal grid plan is the most expensive type of street layout because it must provide for the contingency of maximum loads on all streets.

In the design of local streets for residence, business or shopping the traffic considerations should be subordinated to the needs of frontage access and the safety of pedestrians. There are two types of local streets. Major or "collector" streets are those which provide circulation, tie together the component parts of the residential area and give clarity to the design. Minor or "access" streets are those which only provide entry to the properties on their frontage (the diagrams on pages 64 and 65 show residential street sections recommended for housing projects).

The characteristic feature of a main artery or highway is that the free flow of traffic is the paramount consideration, rather than access to properties on the frontage. Arteries should normally be spaced so that the areas bounded by them are each adequate to support an elementary school and those community services which draw together the inhabitants into a common appreciation of neighbourhood identity. When housing is built at moderate densities this usually means that arteries should be between three-quarters and one mile apart.



Example of Setting Out Curve by Deflection Angle Method

The surveyor sets up his theodolite at the beginning of the curve (point of curvature) and finds from tables that a radius of 193.19 feet is based on chords of 100 feet subtending an angle of 30°. The relevant deflection angle is half of this, i.e. 15°.

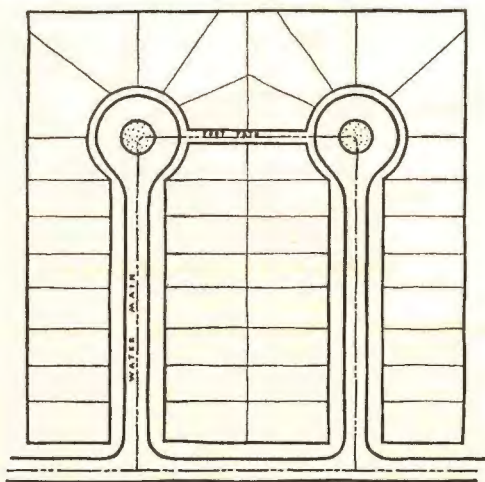
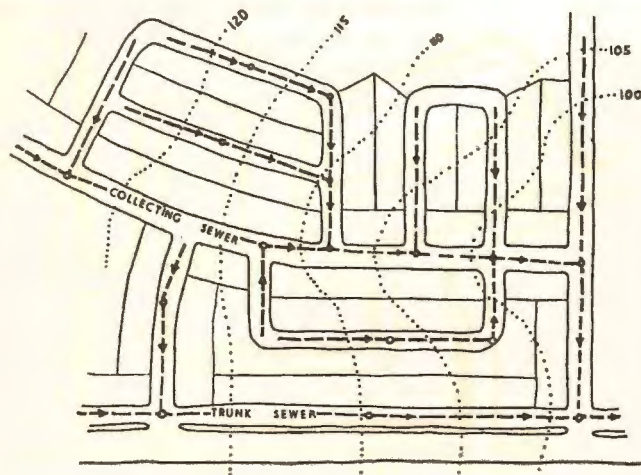
He turns the theodolite through an angle of 15° and an assistant chains a length of 100 feet to establish point "a". The instrument is turned through another 15° and a chainage of 100 feet from point "a" fixes point "b". This process is repeated until sufficient points are found.

Radius and Degree of Curve

		(Based on 100' chords)			
Degree (D)	Radius (R) In Feet	Degree (D)	Radius (R) In Feet	Degree (D)	Radius (R) In Feet
1	5729.65	11	521.67	21	274.37
2	2864.93	12	478.34	22	262.04
3	1910.08	13	441.68	23	250.79
4	1432.69	14	410.28	24	240.49
5	1146.28	15	383.06	25	231.01
6	955.37	16	359.26	26	222.27
7	819.02	17	338.27	27	214.18
8	716.78	18	319.62	28	206.68
9	637.27	19	302.94	29	199.70
10	573.69	20	287.94	30	193.19

Diagrams opposite show relationship of major artery, collector streets and minor streets, with the proportionate traffic loads on streets and sewers.

Diagram below shows street system and sewers planned in relationship with contours so as to give adequate fall. Positions of manholes are shown.



Streets

Curves and bends in streets should be set out with true radii. (The use of "French Curves" is not recommended). This will greatly expedite the work of the engineer and surveyor on the site. Furthermore suitable curves should be selected from degree tables, rather than set at arbitrary round figures such as 40', 80' or 100' radii. The diagram opposite illustrates a simple method for setting out curves.

Curved streets are pleasant but consideration should be given to the fact that they add to the number of sewer manholes required. Each manhole costs about \$300.

It is desirable to design street bends and junctions at angles compounded of 90°, 45° and 22½°, since these are the angles of manufacturers' standard pieces in vitrified clay and concrete pipes. If these standard pieces are not used bends have to be formed by setting pipe-lengths at slight angles to one another, with consequent loss of strength at the joints.

Sewers

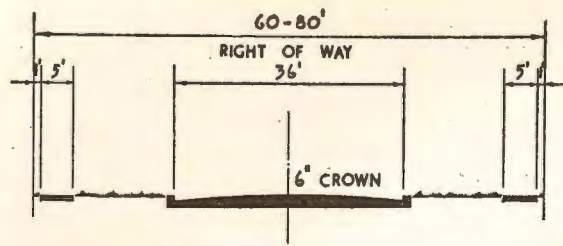
The major "collector" streets within a neighbourhood can usually be planned to serve as routes for main sewers to collect sewage and storm water from the minor streets. Careful attention to topography is necessary in the layout of such minor streets when they are in the form of loops and culs-de-sac. There should be a higher elevation at the head of the loop or cul-de-sac than at the open end.

Culs-de-Sac

The planning of a cul-de-sac requires a special consideration of water mains; at a dead-end these require a "blow-off" valve to remove turbid or stagnant water. Installation of a fire-hydrant will, if acceptable, fulfil the double purpose of fire protection and the cleansing of mains. The planner may also be able to simplify the system by connecting the heads of adjoining culs-de-sac with a footpath right-of-way, thus enabling water mains to form loops. This arrangement is convenient both for the movement of pedestrians and for the movement of water.

SUGGESTED STREET WIDTHS IN RESIDENTIAL AREAS

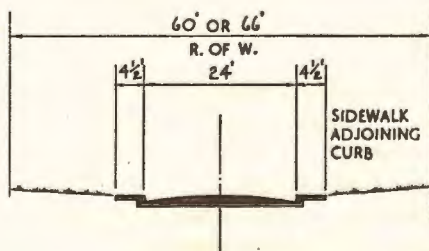
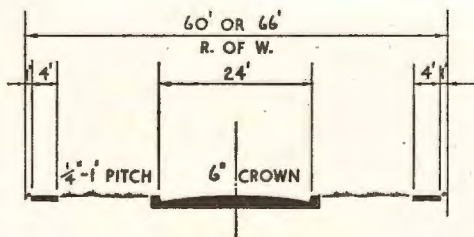
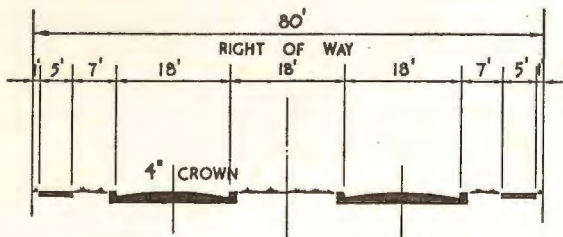
The diagrams below illustrate suggested sections of residential streets as a general basis for design. Topography and function must determine the correct design, subject to the approval of the appropriate local authority.



Collector Streets

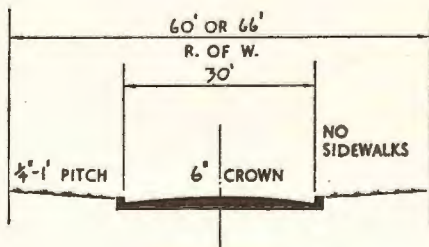
These are intended to provide for the circulation of local traffic within a neighbourhood; they should be planned in such a way that they do not offer short-cuts between traffic arteries or otherwise invite cars and trucks that do not have a destination within the immediate area. Connections with traffic arteries should be not less than a quarter of a mile apart.

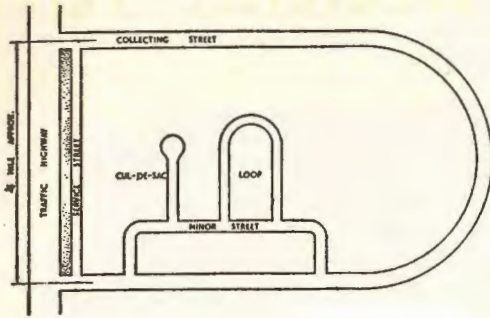
In the planning of residential areas and subdivisions the setting out of collector streets determines the general framework of the design. On the plan and on the ground this circulation system should be continuous and clearly apparent and should not become lost in short-length minor streets.



Minor Through Streets

Three types of section are suggested for minor through streets. They should only be used to connect with streets of similar type and with collector streets.



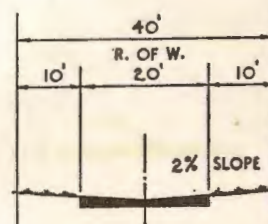
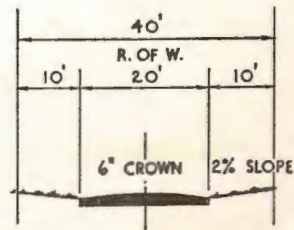
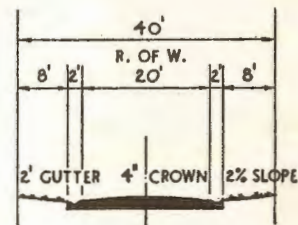
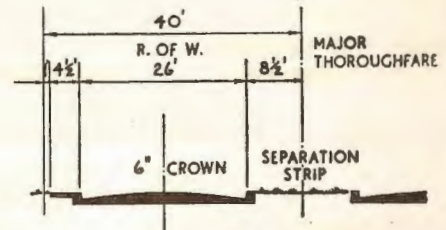
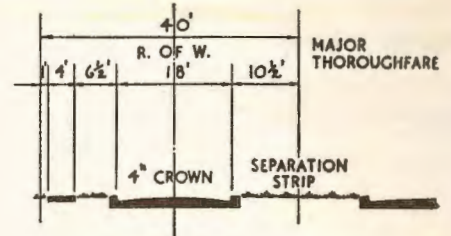


STREET TYPES

The diagram illustrates the relationship of various types of street to one another in a system designed to give economical construction and traffic safety.

Access Streets Bordering Arteries

This type of street is required where residential land is adjacent to a main traffic artery. A subsidiary street is needed to provide access to the residential frontage, separated from the flow of traffic on the artery.



Minor Loops and Culs-de-sac

If acceptable to local authorities, streets of economical section may be used to serve a limited residential frontage. The length of a cul-de-sac should not exceed 500 feet and the turning circle should have a radius of not less than 80 feet.

Schools

It is generally accepted that the school is the principal feature in the planning of a neighbourhood area. The size of a neighbourhood is limited by the distance that can conveniently be travelled in going to and from school and by the number of pupils that can conveniently be accommodated in a school building. While both of these factors are, of course, very flexible yet it is possible to determine certain optimum standards.

Size of School

Opinions on the desirable size of a school depend upon several factors. Attention must be given to the

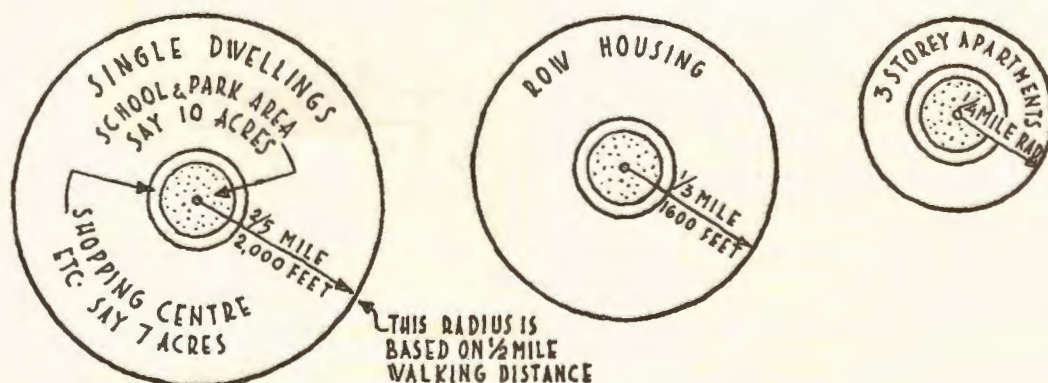
most effective arrangements for teaching and for administration of the school staff while, at the same time, there must be consideration for the economies of construction, heating and maintenance. Canadian educational authorities have generally agreed that an elementary school should have not less than 10 class rooms with about 30 pupils to a room, giving a school enrollment of between 300 and 500. This would require a school building about 10,000 square feet in area and a school site of not less than five acres.

Area Served

A calculation of the area to be served by each elementary school depends upon the desirable number of pupils to be accommodated, the density of the residential area (number of families per acre) and the average number of children of school age per family.

SIZES OF SCHOOLS

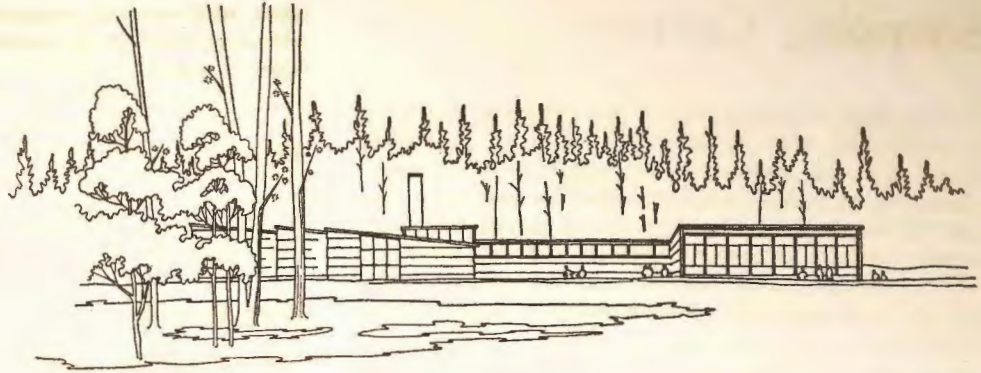
	Grades	Ages	Number of Classrooms	Pupils per Room	Pupils per School	Area of School Site
KINDERGARTEN	—	5-6	2	35	70	Normally combined with elementary school
ELEMENTARY	1-6 or 1-8	6-12 or 6-14	10 min.	30	300-500	5 acres
JUNIOR HIGH	7-9	13-15	18-30	30	500-800	7-11 acres
SENIOR HIGH	10-12 or 10-13	16-18	18-30	30	1,000 max.	11-13 acres



Distribution of school sites depends upon density of the development in a neighbourhood and the sizes of the schools desired.

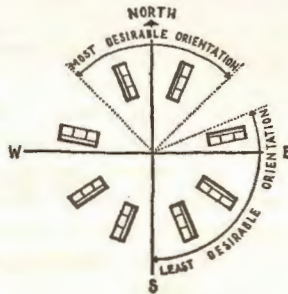
CADBORO' BAY, B.C.

Modern elementary school of light construction.



In new suburban areas settled by recently married couples the fertility rate is high and peak conditions may render as many as 1.5 children of elementary school age per family. This proportion will gradually decline to the average for urban areas as a whole, which is 0.4 children of school age per family.

This change in the educational load, arising out of a change in the character of the population in neighbourhoods, is the principal difficulty in the programme of school building. The largest numbers of children, the greatest expenses in school construction and staff are placed upon suburban municipalities that often have the smallest tax resources. Meanwhile there is a declining demand upon schools in central city areas. One means of reducing this difficulty is the planning of neighbourhoods containing a diversity of types of housing accommodation, for a variety of households and age-groups, thus tending to stabilize the school population in each neighbourhood area. There may also be a long-term effort to conserve and rehabilitate older neighbourhoods in order to resist the movement to suburban areas.



School Site

The site of a school should be well removed from main traffic arteries and should be free from noise, smoke, dust and any distractions and nuisances. To reach the school, children should not have to walk more than half-a-mile, should not have to cross traffic arteries or pass through industrial or commercial areas. The routes to the school should, as far as possible, be along quiet streets and through park lands.

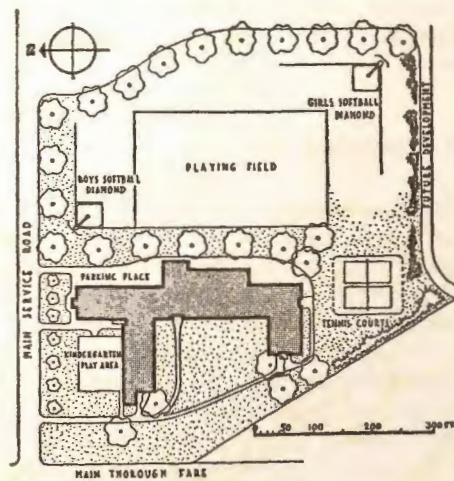
The selection of school sites should be coordinated with the planning of park areas so that open spaces may be combined to serve all the requirements of the community. The conception of the "school yard" as a confined space for exercise between classes has been extended to the aim of providing outdoor recreation areas for wider educational and community use. Space is required for organized sports but also for less

active pursuits such as the cultivation of gardens and also for the quiet enjoyment of trees and lawns. For these purposes the whole school site need not be flat; a more interesting diversity in the use of the land can be obtained when natural contours, rocks and trees are retained to provide a landscape composition.

School Design

The development of a school site should be influenced by the fact that a south exposure for classrooms is the least desirable and an east exposure preferable. Classrooms should face away from the street and be oriented towards the recreation space.

Although sound community planning may stabilize the school-age population it is inevitable that there will be changes in the amount and character of school space required. For this reason the plans of school buildings should provide for flexibility of use and for both extensions and withdrawals of space. For purposes of adaptability one-storey schools are now generally preferred since they can be light both in construction and fenestration.



CALGARY, Alberta

Layout of elementary school site, showing recreation areas.

Shopping Centres

A suburban shopping centre as an integral part of a residential area is preferable to the customary string of stores along a traffic artery or the random clustering at traffic intersections. The size and location of the site must be determined in the process of setting out neighbourhood plans.

The modern shopping centre has arisen largely out of circumstances created by automobile transportation. In order to free the movement of traffic it has become necessary to remove commercial frontage from main arteries. It has also become necessary to provide adequate parking yards for shoppers who concentrate at large foodmarkets and other household stores. Furthermore it has seemed desirable to offer suburban shoppers a quality of merchandising to which they are accustomed in central department stores, without the problems of travel and parking at the city centre.

Neighbourhood Centres

Small shopping centres may be placed about one mile apart in low density residential areas, coinciding with the distribution of elementary schools and thus strengthening the identity of neighbourhood units. It has been found that the most satisfactory location is on the down-town side of a neighbourhood since this is the most usual direction of travel. While from the point of view of accessibility for small-scale family shopping it is convenient to have such a centre within the boundaries of a neighbourhood, yet in most cases it will be necessary to place such a group of shops at the point of access from a main artery. A neighbourhood shopping centre should be of the most modest proportions so as not to become a focus of traffic from other areas.

District Shopping Centres

A district shopping centre may serve a group of neighbourhoods in much the same way that a High School serves the areas of several elementary schools. Experience has not shown that down-town stores are damaged by this competition, presumably because the outer centres depend upon the market created by new urban growth which can be reached in this way through the establishment of branches of stores in the central area.

The successful development of a major district shopping centre involves a careful market analysis by specialists in this field. The rival attractions of other present and future commercial developments must be assessed. It is found that an element of competition within a shopping centre is beneficial; customers like to compare the quality and prices of

merchandise and progressive merchants appreciate the attraction and stimulation provided by stores of similar type.

Site

As a basis for determining the space requirements for shopping centres a proportion of 0.7 acres per 1,000 population may be used as a rough guide. This includes parking space. For centres containing from 10 to 15 stores a site with about 500 feet frontage and 300 feet depth has been found satisfactory. Centres with 15 to 30 stores have been satisfactorily located on an area about 800 feet by 400 feet. It is not possible to lay down a fixed ratio between the amount of store space and the amount of parking space because the requirements depend upon the proportion of customers who may be expected to arrive on foot or by car in any particular location. If all customers came by car the ratio of parking space to store space would be four to one; if only 25% came by car the ratio would be one to one.

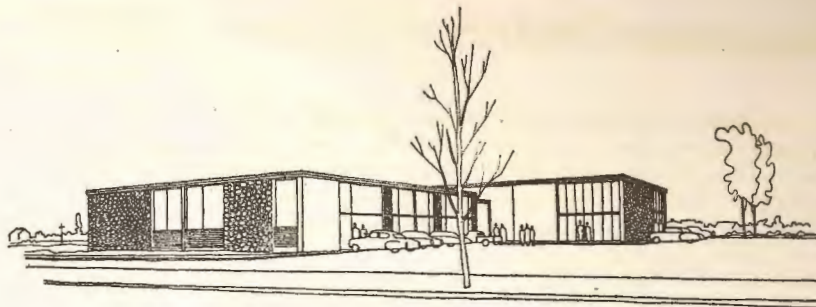
Uncontrolled and parasitic development of stores on adjacent land may adversely affect the character and business of the planned centre and create traffic congestion. Protection can be provided through zoning restrictions and by planning an appropriate use of the adjacent lands. It may be possible to set the shopping centre in direct relation with a local park and other community features forming the "core" of a neighbourhood or district. It is also advantageous to plan for a high density of residential land use near to a shopping centre; this is an appropriate location for apartments and other multiple buildings. In this way the largest number of people and the bulk of purchasing power is concentrated near to the shopping centre and the apartment buildings serve as a buffer between the retail centre and the area of single family houses.

Design

Since the Shopping Centre is a comparatively new feature in the urban landscape it is too early to prescribe an ideal arrangement. New types of plan will evolve out of a process of trial and error. The principal planning aim is to simplify the entry and exit from traffic streets, to expedite parking and access to shopping floors. Some plans of buildings are L-shaped on two sides of a parking yard, some buildings are islands in the centre of parking yards. There appears to be considerable merit in a type of plan which provides a small central open space with stores grouped around it; a customer, having parked his car on the exterior of this market place, may then enter the interior quadrangle or mall and enjoy the pedestrian scale of this quiet enclosed space and the shop fronts facing upon it.

TORONTO, Bayview Avenue

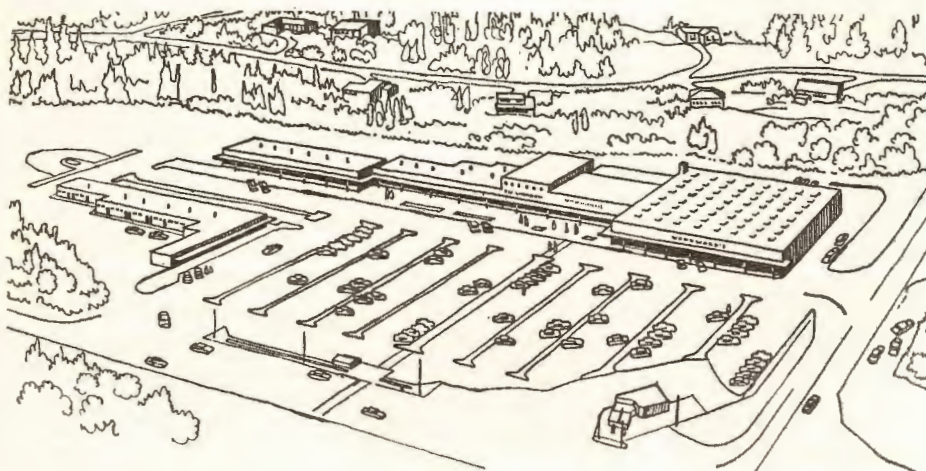
This small local shopping centre designed by architect John Layng shows the grouping of stores to form a building of attractive architectural character, on a main artery bounding high-class residential areas.



PARK ROYAL SHOPPING CENTRE

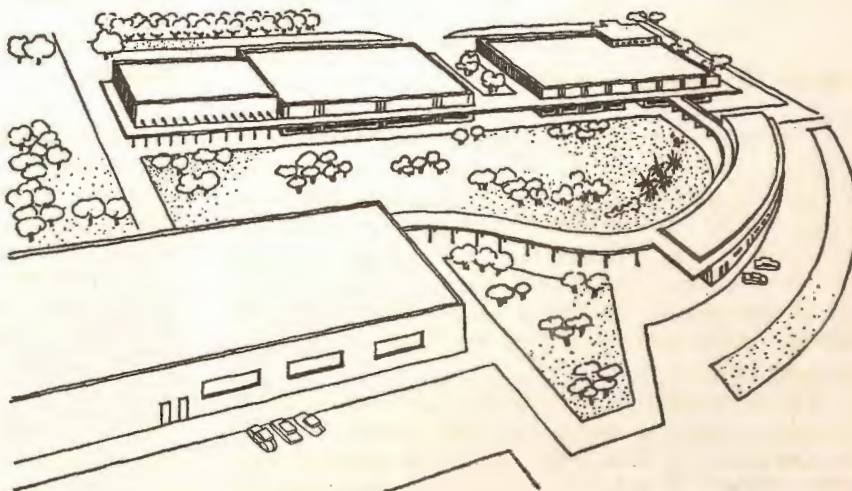
West Vancouver, British Columbia

Designed by architect C. B. K. Van Norman this is the first comprehensively planned district shopping centre in Canada. It is strategically placed at the north shore bridgehead entry to serve a new residential district.



LINDA VISTA, California

Designed by architects Earl Giberson and Whitney Smith to serve a 3,000 unit defence community near San Diego, the shopping centre exemplifies the "mall" type. Stores of various sizes and character are grouped around an attractively landscaped open space within which children and pedestrians are entirely separated from traffic.



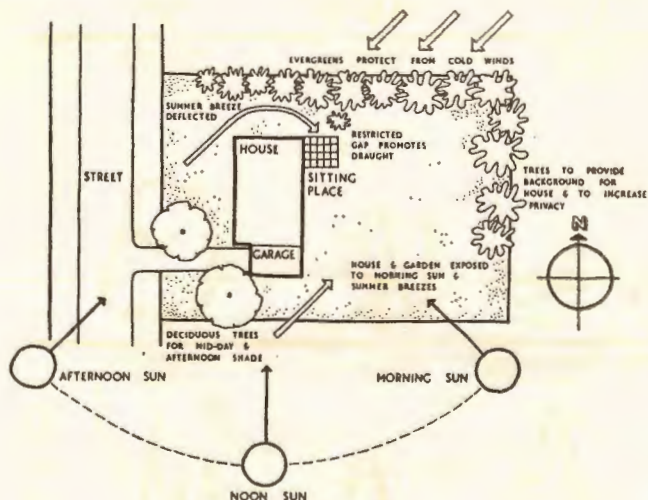
Landscape and Open Spaces

In any residential land only about one quarter of the area is occupied by houses and by street pavements. The remainder of the land must be given some permanent surface, such as mown grass, stabilized so that the ground will not be moved by the action of water, wind and frost. Trees, shrubs and hedges add to the consolidation of the ground and provide shelter from the sun and the wind. The surfacing and planting of the open spaces of an urban landscape have a utilitarian as well as a decorative effect; consequently this is an important element of housing design and represents a small but essential item of housing costs.

Ground Surface

The finished grading of the land must provide for a natural run-off of surface water, falling away from buildings and towards catch-basins, without pockets to collect standing water. The most pleasant effect is obtained when houses are set low in the ground and the natural contours of the land are retained; for this reason the cut-and-fill of basement excavations is an important feature of the landscape design.

To obtain a permanent carpet of grass there must be a spread of topsoil, preferably a sandy loam. This provides plant nutrients, absorbs some surface water and passes a proportion of it through to the subsoil where it can be reached by the roots of trees and shrubs.

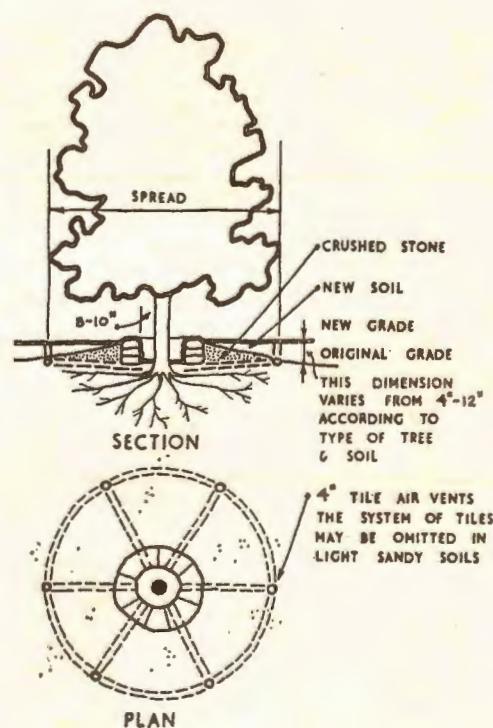


Trees

Trees are a natural-air-conditioning apparatus. They have a cooling effect in summer on account of the direct shade on the ground and on buildings and because foliage does not reflect heat. In summer time they reduce roof temperatures by day and radiation at night. A windbreak which cuts winter wind velo-

cities from 12 to 3 miles per hour at 32° may cut fuel consumption in half.

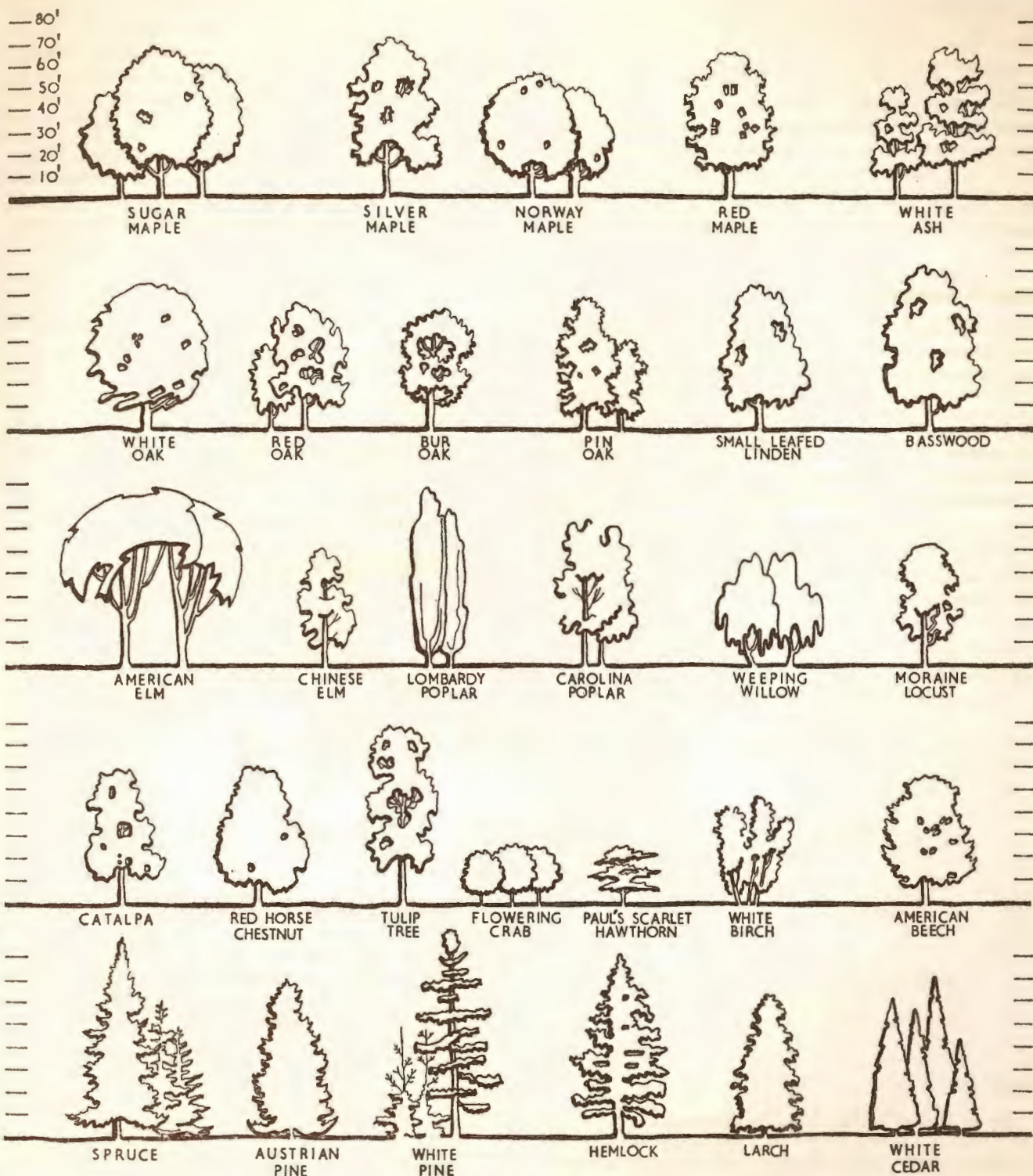
Since trees add value to property and take a generation of time to grow to mature size, the greatest care should be taken to preserve them on the site of housing developments. In the conversion of farm land it is usually possible to preserve well-rooted fence-line specimens. In the clearing of bushland it is advisable to retain trees in groups because the shallow roots are usually inadequate to give support to individual specimens. In order to preserve trees it is best to set grades from their base. It is important not to place more than a few inches of overburden on their roots. Where the existing grade has to be changed it is possible to preserve isolated specimens by constructing a basin or a small retaining wall around their bases.



In urban areas evergreen coniferous trees are disappointing in growth because they do not have an opportunity to shed the deposit of dust that is absorbed from the atmosphere. Deciduous trees are clean, most decorative in their limbs and branches and do not obstruct sunshine in the winter months.

In planting trees along a street it is best to use one variety on each length of street so as to give a consistent character to the landscape design and so that, in early stages of growth, the trees can be protected, trimmed and sprayed in a methodical way. Street trees may be planted 50 or 60 feet apart, alternating on either side of the street. They should be at least 25 feet from an intersection, 10 feet from a fire hydrant, 3 feet from a curb and 20 feet from a house.

TREES FOR THE URBAN LANDSCAPE



Tree heights indicated are average mature growth in Central and Eastern Canada.

Public Open Spaces

In order to justify the reservation of valuable urban land as open space it must be put at the disposal of the greatest number of people, of all age-groups in the community. The fullest advantage must also be taken of land which is not suitable for building purposes, such as low-lying land, water courses and rocky landscape; these may be converted into valuable assets.

The use of open spaces depends upon their accessibility. In this respect the Radburn type of plan is the most effective that has been devised; this provides a continuous belt of green space, linking together private gardens with public park lands and recreation areas. A systematic scheme of open spaces may thus have far greater use than a much larger area of land that has no direct connection with each home.

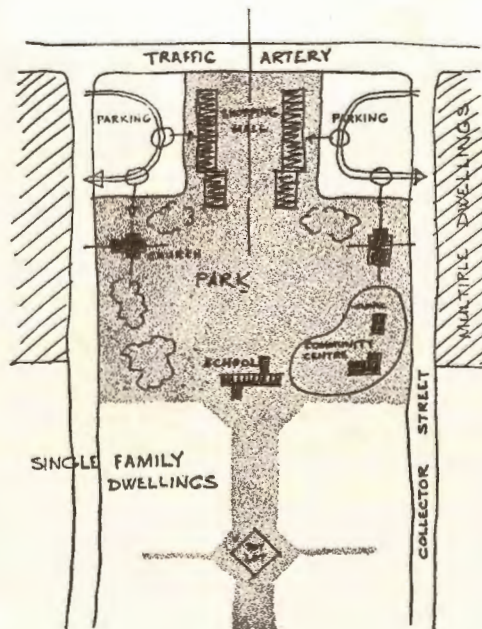
Since the circulation system of a neighbourhood is naturally focussed on the shopping centre, school and other community features it follows that the major open space will also be most accessible if it forms part of the neighbourhood core. The accompanying sketch illustrates the general principles of a relationship between open spaces and community buildings, grouped around the central open space to form a neighbourhood core or precinct.

On account of the different conditions and topo-

graphical features of each site there is no universal standard that can be prescribed for the provision of open space. As a rough guide it is suggested that a neighbourhood recreation area should provide about one acre per 1,000 population. Most of this area may be of grass surface; a hard-surfaced space about 200 feet by 120 feet is sufficient for two tennis courts, basket-ball, volleyball and a winter hockey rink.

In addition to the major open space small playlots for pre-school children may be distributed throughout the neighbourhood, in close association with groups of houses and on pedestrian routes. These may each be about 45 feet by 90 feet to serve a group of about 50 housing units. The exterior of this space should be hard-surfaced to form a track for wheeled toys; benches for watching mothers should be provided. The usual equipment for a playlot is a sandbox 15 feet by 20 feet, a quadruple swing and teeter-totters, a slide and a junglegym. However the most attractive and original features can be constructed out of wooden blocks, concrete tile, low masonry walls, or tree stumps to form simple sculpture in the landscape.

The planting of trees and hedges provides the permanent shape and character in the design of open spaces. Hedges are the most effective and decorative material with which to divide private space from public space and to define the routes of paths. Trees grow to be larger elements in the landscape than houses themselves; they provide enclosure and shelter for the life of a community, comparable with the roof and walls which contain each family dwelling.



Each of the previous chapters has dealt with one of the component parts of residential areas, with housing of single and multiple form and with community services. All these elements of housing design are to be fitted into the larger framework of plans, policies and public works which direct the growth of urban Canada.

The process of urban growth takes place in three different ways. Most familiar is the process of marginal expansion into new suburban areas on the fringes of towns and cities. All the orthodox procedures of community planning, zoning, subdivision control and housing project design are available to direct this expansion in an orderly fashion.

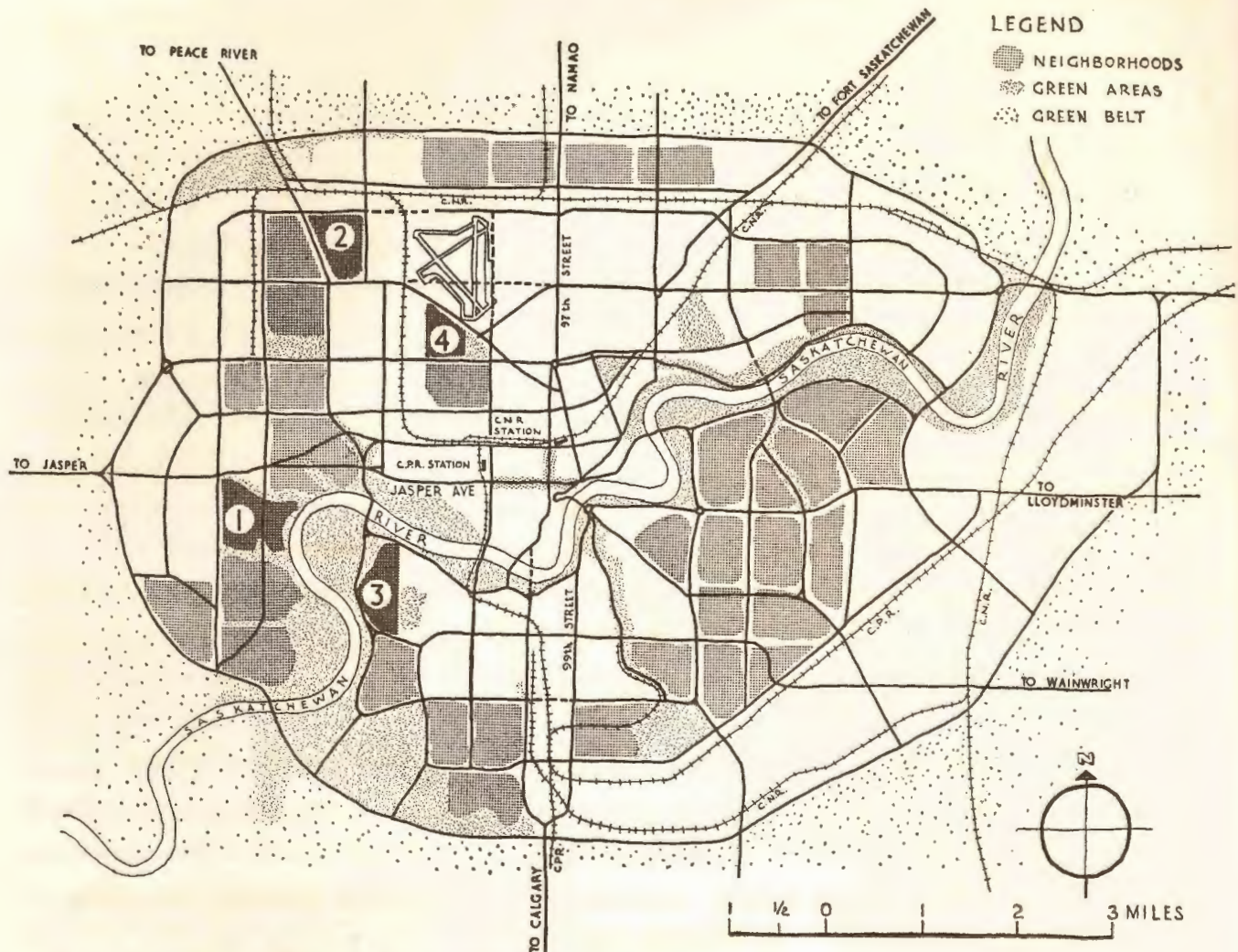
Less familiar as yet in the Canadian scene is the process of redevelopment at the hearts of towns and cities. This is a form of rejuvenating growth which all mature urban areas must undertake at that certain age when housing at the heart has withered and become obsolete. The first experiments in redevelopment have been made in Canada and the National Housing Act now provides financial aids to municipalities for this purpose.

Thirdly there is the process of growth of which Canada has had special experience, the building of new towns. These may be on the frontiers of national development where new resources are being tapped. Or new towns may be satellites to established urban centres, new points of concentration in expanding industrial regions.

A healthy process of urban increase requires a reasonable balance between these three directions of growth. Large cities are expensive to operate and there is value in checking overgrowth through the planning of encircling greenbelts, at the same time cultivating the growth of satellites. Meanwhile the flight to the margins of the city out of the decaying heart can be checked by reorganizing the interior and bringing it up to date. The directing and balancing of these processes of growth is Community Planning, in the largest sense of the term.

The following pages present some examples of residential planning in each of the three environments of the suburbs, interior redevelopment and the new town. In each of these settings the general principles of housing design and neighbourhood planning are applicable.

Neighbourhood Planning in Suburban Areas



CITY OF EDMONTON, showing neighbourhood areas.

The general plan of EDMONTON, above, shows the neighbourhood areas that have been set out since 1950 by the city's Town Planning Department (Noel Dant, town planner) to contain the suburban expansion of the city. Four examples of individual neighbourhoods are illustrated opposite. The process of residential development is guided so that neighbourhoods are planned, approved, serviced and built up in orderly progression. The neighbourhoods range in size between 205 acres for a 2,200 population and 274 acres for a 4,000 population; each has an elementary school, recreation park, shopping district and some land planned for apartment development.

The opportunity to carry out such a comprehensive and detailed planning scheme arose largely out of the public ownership of a large proportion of lots that had reverted to the municipality in an earlier period of the city's history. The original grid-iron plan was reorganized in order to separate interior neighbourhood streets from the new system of traffic arteries. The conversion of land previously in single family lots has also made it possible to introduce apartment, duplex and row housing, thus considerably raising the population supported by the public investment in streets and services and establishing better balanced communities.

Some Edmonton Neighbourhoods



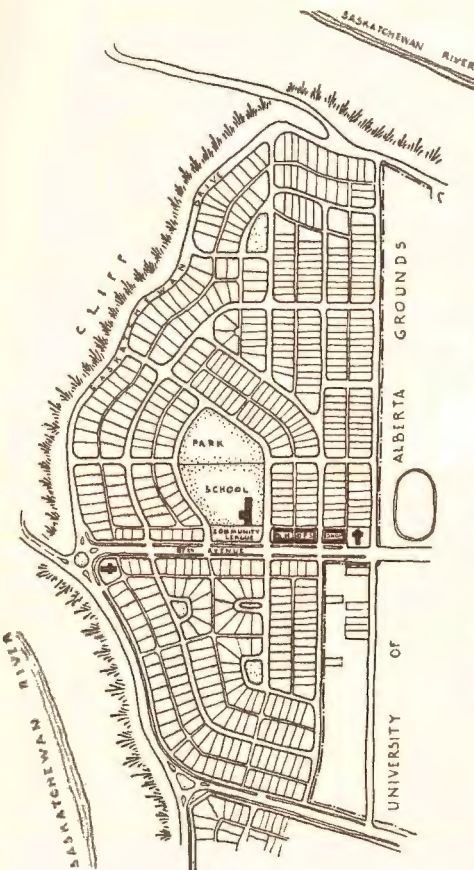
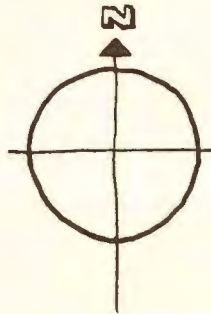
1. CRESTWOOD

A neighbourhood area of 274 acres for a population of 3,680 in 902 units with two schools (10 acres), parks (10 acres), local shopping (2 acres). This is a relatively large neighbourhood with middle-income housing in the western part and a special area in the east facing on ravine and parkland. The eastern part is subject to amenity restrictions on house plans and values, with design control by the City Architectural Panel. There is provision for about 30 apartment units at the core (1.5 acres). The neighbourhood was begun in 1953 for likely completion in 1955.



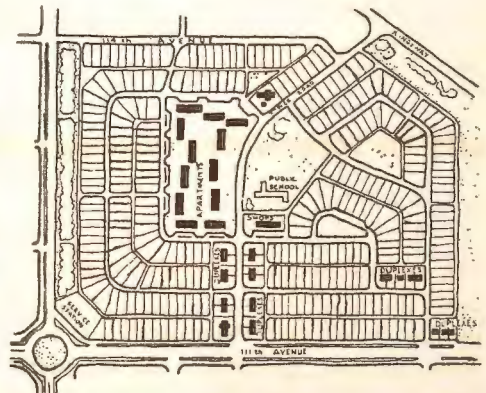
2. SHERBROOKE

A neighbourhood of 22 acres for a population of 4,800 in 1,397 units with two schools (10 acres), parks (4.4 acres), local shopping (2.2 acres). 112 acres are assigned for houses, 10.5 acres for duplexes, 7 acres for row-housing and 9.5 acres for apartments. Before re-planning this area would have contained a population of 3,400 in 1,068 units; street lengths were reduced from 37,960 feet to 27,600 feet.



3. WINDSOR PARK

A neighbourhood of 205 acres for a population of 1,840 in 496 units with school (6.2 acres), parks (4 acres), local shopping (1.5 acres). This neighbourhood, bounded on two sides by river valley and parkland and on the east by the campus of the University of Alberta, is devoted entirely to low-density restricted housing. Adjoining this area, on the other side of a six-lane highway, is the Prince Rupert sub-neighbourhood which contains middle income and more diversified housing accommodation.

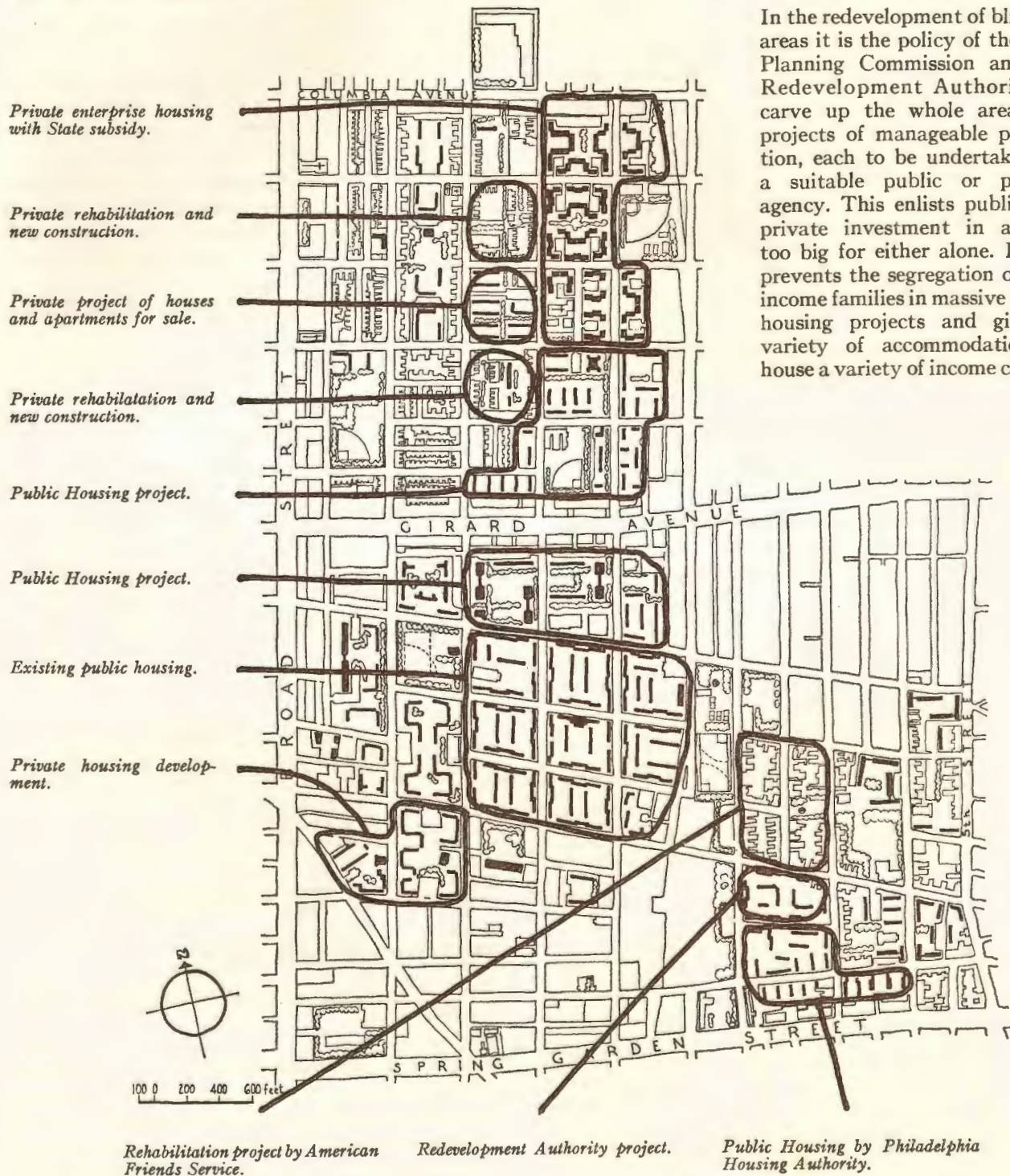


4. PRINCE RUPERT

Though normally regarded as too small in size for a complete neighbourhood plan this 115 acres is isolated by traffic arteries and therefore planned as a sub-neighbourhood for a population of 1,700. Besides school (6 acres), parks (6 acres), local shopping (1 acre), it has 325 single-family lots (43 acres) and land for about 22 duplex units and 120 apartment units (8.5 acres).

Redevelopment of a Central Area in the U.S.A.

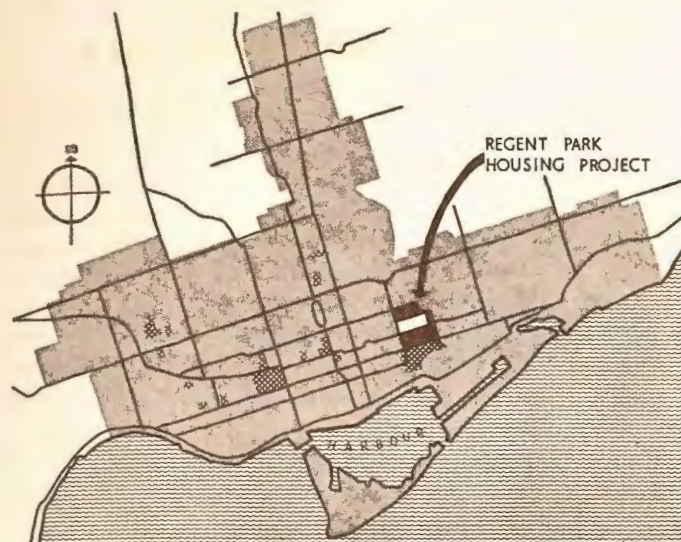
TEMPLE REDEVELOPMENT AREA



PHILADELPHIA, U.S.A.

In the redevelopment of blighted areas it is the policy of the City Planning Commission and the Redevelopment Authority to carve up the whole area into projects of manageable proportion, each to be undertaken by a suitable public or private agency. This enlists public and private investment in a task too big for either alone. It also prevents the segregation of low-income families in massive public housing projects and gives a variety of accommodation to house a variety of income classes.

Slum Clearance and Re-housing in Canada



TORONTO, Ontario

The Regent Park public housing project is the first large-scale redevelopment in a Canadian city. The plan shows its location in relation with the blighted areas mapped by the City Planning Board in 1944. The 42 acre site, covering six city blocks is being cleared to provide more than one thousand units in three-storey apartments and row-houses, with rents adjusted to income and family size. Federal government aid was obtained under Section 12 of the National Housing Act, the Province contributes \$1,000 per unit and the project is administered for the city by the Toronto Housing Authority.

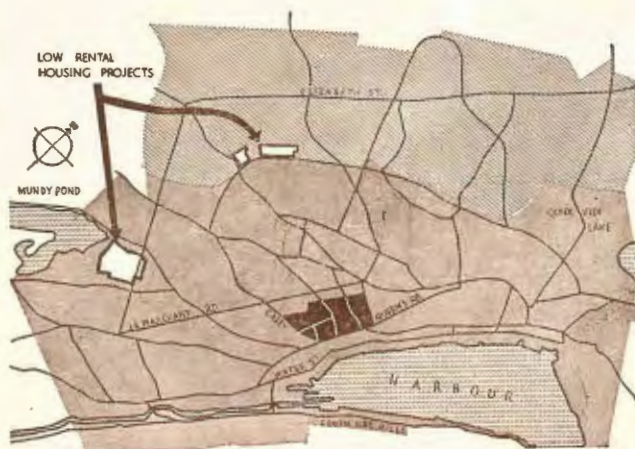
SAINT JOHN, New Brunswick

The plan shows blighted areas mapped by the Town Planning Commission in 1946, the Prince Edward Street area under consideration for redevelopment and the site of the first low-rental housing projects on the fringe of the city. These projects for 288 units, in the form of duplexes in blocks of six and eight units, will house families with incomes between \$1,200 and \$3,600, with rent adjusted to income and family size. The housing is built under Section 35 of the National Housing Act by the federal and provincial governments and administered by the Saint John Housing Authority. Subsequent projects are under consideration for the clearance and redevelopment of the Prince Edward Street site.

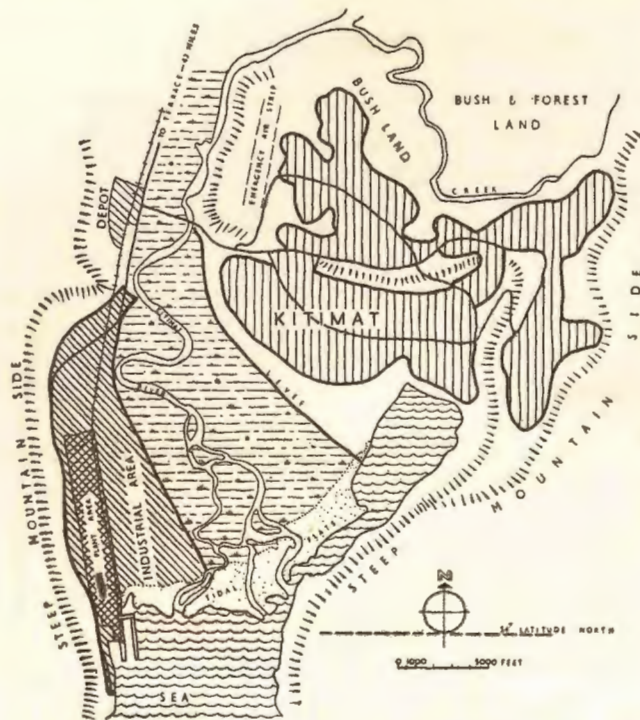


ST. JOHN'S, Newfoundland

The plan shows the principal concentration of sub-standard housing within which a considerable area has already been cleared. Since 1950 there have been 292 duplex housing units built for families taken from the clearance area with incomes ranging from \$960 to \$3,600, rents being adjusted to income and family size. The low-rental housing is constructed under Section 35 of the National Housing Act by the federal and provincial governments in partnership, the housing being administered by a local Housing Authority.



New Towns in Canada



KITIMAT, British Columbia

The new town is designed for the Aluminum Company of Canada by architects and planners Mayer & Whittlesey and Milton Glass, under the general direction of Clarence Stein. The key plan (left) shows the location of the town in a mountain basin beside the Kitimat River and the relationship of the residential area to the industrial plant. The form of the town is governed by the very rugged topography.

The general plan (below) shows the organization of the town into neighbourhoods each enclosing an open space and the site for community buildings. The plan of the first neighbourhood to be developed is shown opposite; other neighbourhoods will be planned and built in response to the demand for housing space, working out from the centre towards the land at a higher elevation to the east.

The City Centre, the principal commercial district, is placed at the entry to the town; a subsidiary Centre is planned for the upper level of the town when this is developed. In addition each neighbourhood will have its own small shopping centre.



A Kitimat Neighbourhood

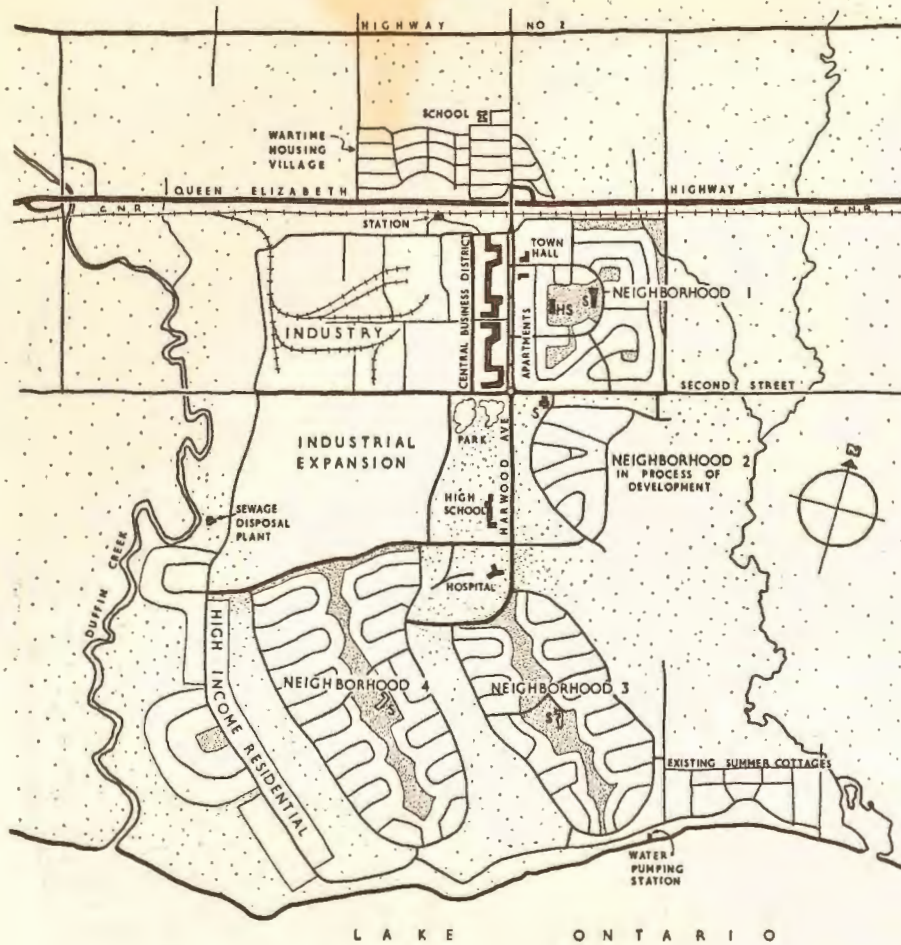


KITIMAT

The first neighbourhood to be developed will provide three-storey apartment blocks, row housing, semi-detached and single houses to accommodate approximately 1,420 families on about 280 acres. It is anticipated that this will represent a total population of about 5,700 and render a working population of about 1,775. There are three school areas in the neighbourhood. In sequence with the Radburn and Greenbelt plans the circulation system provides a clear distinction between pedestrian and traffic routes. A detail of this plan is shown on page 59.

The area separating this neighbourhood from that immediately to the south is a steep forested slope that cuts across the whole residential site and separates the town into upper and lower levels.

New Towns in Canada



AJAX, Ontario

This new town 25 miles from Toronto was planned for the Central Mortgage and Housing Corporation (Kent Barker, town planner) on 3,000 acres formerly the site of a shell-filling plant and 600 wartime houses. Neighbourhood 1 and a shopping centre have now been developed and factory sites are being occupied to make Ajax a thriving manufacturing satellite progressing towards municipal self-government.

DEEP RIVER, Ontario

Its community centre, shops and schools grouped around a green space on the banks of the Ottawa River 100 miles from the Capital, the town was planned to house workers in Canada's atomic energy plant (John Bland, planning consultant). A modern self-contained community built and operated by government agency, Deep River demonstrates the way in which fine Canadian landscape can be made part of the amenity of a town.



